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AUTHOR	McGuire, Carson
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ABSTRACT

This is a report on changes taking place in boys and girls (288 Anglo boys and 288 Anglo girls) studies in the Human Talent Research Program during their years in the junior high schools of four Texas communities. Influenced by the emergent zeitgeist, or spirit of the times, the subjects were observed as they progressed from preadolescence through adolescence, particularly in regard to both intellectual and talented behavior, which is defined as behavior of an individual in a situation wherein performance is evaluated within a framework of expectations. Literature reviews on behavior change together with discussions on intelligence theories are presented. Models for representing sets of behavioral capabilities are described and diagrammed. External as well as internal pressures on the population are noted. Results and bibliographies are included in each chapter, and statistical data and a description of variables are presented in a special index. (Author/CJ)

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THE YEARS OF TRANSFORMATION

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THE YEARS OF TRANSFORMATION

Final Report
of

Cooperative Research Project No. 742,
"Factors Associated with the Educational
Utilization of Human Talent (Part Two)"

CG005306

Carson McGuire

1970

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CHAPTER I

WHAT THIS REPORT IS ABOUT

The Years of Transformation is a report upon changes taking place in boys and girls studied in the Human Talent Research Program (HTRP) during their years in the Junior High Schools of four Texas Communities. Some of the changes have been a consequence of each individual's inevitable human encounter with the biological phenomena and cultural expectations associated with puberty and the transition of each from childhood to adolescence. Over and above individual differences and errors of measurement, some patterns of transformation can be discerned. These patterns differ according to sex role, ethnic group, social class, and other "marker variables" which signify the likelihood of similar learning experiences encountered by the young people so classified. This chapter begins with a look at **zeitgeist**, or spirit of the times, which has influenced individuals in the HTRP population as well as the analyses and interpretations of the data gathered from and about them.

From the time of Francis Galton, a cousin of Charles Darwin, Western man has been aware of and able to represent by numbers the nature of individual differences among human beings. When they begin to be accepted, either consciously or unconsciously, new ideas together with a means of conceiving and talking about them inevitably have an impact upon the beliefs and values held by men and women who influence action. Karl Pearson, biographer of Galton and a man who laid many of the foundations for modern statistical theory, has provided an excellent example of what a fresh frame of reference can do. For instance, he reflected upon the impact of ideas introduced by Karl Marx (the stratification of man in society), Charles Darwin (natural selection), and Sigmund Freud (non-rational elements in man's behavior).

Thus, he began The Grammar of Science (1892; reprinted by Everyman, 1937) with a revealing sentence.

> Within the past forty years so revolutionary a change has taken place in our appreciation of the essential facts in the growth of human society, that it has become necessary not only to rewrite history, but to profoundly modify our theory of life and gradually, but none the less certainly, to adapt our conduct to the novel theory (p. 7).

The present report has been written after a lapse of several years which permitted considerable reflection upon the spirit of the time, or zeitgeist, particularly with reference to the manner in which intelligence and human talent have been understood, appreciated, and valued. During those years, another revolutionary change has taken place. The Elementary and Secondary Education Act of 1965 (ESEA-1965) marks a new era in policies and provisions for the utilization of human talent within the United States of America. The legislation and subsequent appropriations of funds appear to have been based upon the premise that learning is the key to ultimate survival upon this planet and the corollary that an effective pattern of education is a necessary foundation for what President Johnson terms "The Great Society."

The forces operating to bring about this fresh climate for education were discernible in 1962. As this is being written, the forces can be seen even more clearly. Prior to and during 1962, the Director of the Human Talent Research Program had prepared a number of reference papers which analyzed the ideas and forces that were destined to bring about a renaissance in education during the middle of the decade 1960-70. Since these papers were made possible largely as a consequence of involvement in educational research, two representative essays, "Themata for a New Era" and "Decisions in Education;" are reproduced in Appendix C together with references to other published papers. Highly pertinent and readable accounts of the ferment in education and its relation to the utilization of human talent in a free society marked by a great cultural diversity may be found in books by John W. Gardner (1962), Jerome S. Bruner (1966), and Francis Keppel (1966). Appendices to Keppel's book, The Necessary Revolution in American Education, contain copies of Presidential Messages to Congress on Education by John F. Kennedy (January 29, 1963) and Lyndon B. Johnson (January 12, 1965) together with the text of ESEA-1965.

The Zeitgeist for Education and Utilization of Talent

Part II of the Human Talent Research Program (Cooperative Research Project No. 742, USOE) was conceived and much of the research was carried out at Texas during the emergence of this new spirit of the times. David McClelland and his associates on the Committee on the Identification of Talent formed by the Social Science Research Council in 1951 had reported in a book entitled Talent and Society (1958). Their emphasis upon talent identification and an "ability" construct tends to be in the tradition of identifying individuals with "talent" which might be categorized as the "mining approach." In contrast, the emerging zeitgeist favors the cultivation of "talented" behavior and might be labeled the "farming approach."

In the not too distant future, writers are going to point to a fresh view of man and his intellectual behavior as being the key element in the emergent climate of education after the middle of the twentieth century. For too many years, abilities and other attributes of young persons have been regarded as the unfolding of inherited potentialities which await the maturation[1] of neural connections. Previous assumptions and current transformations with regard to the conception of intelligence and its roots have been stated succinctly by J. McV. Hunt in the Preface to his book, Intelligence and Experience (1961).

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[1] The "maturationist" point of view was embraced by all but three of the nineteen contributors to the first Manual of Child Psychology (Wiley, 1946) edited by Leonard Carmichael. The zeitgeist was clearly expressed by Arnold Gessll in his chapter upon "The Ontogenesis of Infant Behavior" (pp. 295-331). He argued that "the concept of

> For over a half century the leading theory of man's nature has been dominated by the assumptions of fixed intelligence and predetermined development. These beliefs... have provided a conceptual framework for the measurement of intelligence and for accounting for the development of human abilities, which have been regarded as the unfolding of capacities almost completely determined by inheritance. Recently, however, a transformation has been taking place in this traditional conception of intelligence and its relation to experience. Evidence of various sources has

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maturation emphasizes the unity of the organism and the priority of a total pattern of response." With reference to learning, he explained, "conditioning is superimposed, as it were, upon a maturational substrate" (p. 315). Contrary to present-day "stair-step" views, Norman L. Munn insisted that "the growth of learning ability is gradual, and one stage... merges imperceptibly with the next" (p. 439). Nevertheless, he concluded that "beyond the early years of childhood, when the handicaps of neuromuscular immaturity have been largely overcome, practically all differences in the learning of children and adults may be attributed to differences in motivation and in previous experience" (p. 440). Margaret Mead (pp. 667-706) drew upon her ethnographic experience as well as the early works of Erik Erikson to emphasize the concept of "cultural conditioning." Kurt Lewin (pp. 791-844) introduced a concept of "cognitive structure," the principle of "adaptation to a situation," as well as the notion of "conflict situation"--ideas which are represented in present day cognitive theory. The transformation of the zeitgeist for the study of child and human development is accentuated when one reads additional chapters and other authors. For example, in reviewing methods of child psychology (pp. 1-42), John E. Anderson labeled as "introspective" the methods employed by Jean Piaget to study children. Similarly, in a chapter on language development, Dorothea McCarthy dismissed Piaget's Language and Thought of the Child as a controversial new approach. Writing on the feeble-minded child (pp. 845-885), Edgar Doll mentioned "low stimulation" and then attributed social abnormality to "incomplete mental maturation." He wrote, "It has long been known that mental deficiency runs in families."

> been forcing a recognition of central processes in intelligence and of the crucial role of life experience in the development of these central processes (p. v.).

The HTRP longitudinal inquiry into the development and dimensions of talented behavior among the boys and girls of four Texas communities could not avoid being influenced by the emergent zeitgeist. Members of the research group worked actively among the young people and with their teachers as they moved through the junior high to the senior high school years, and either graduation or school leaving (dropout or transfer). Observations of the research populations as the subjects progressed from their preadolescent through adolescent years forced the researchers into a searching re-examination of their initial assumptions and earlier conceptions of both intellectual and talented behavior. Then the principal investigator encountered a severe cardiovascular accident (CVA) and had to recover and rehabilitate himself. The "episode"[2] enforced a considerable lapse of time between the initial formulation of the project and gathering of data, on the one hand, and the final analysis and interpretation of findings, on the other. The time taken was not a total loss. After all, the disciplines of child ahd human development are devoted to the study of changes in human behavior over a period of time where time itself is not necessarily the variable of central concern. Accordingly, the report records transformations not only in the subjects but also in the researchers.

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[2] In his book, Episode (Athenium, 1964), Eric Hodgins gives what Adlai Stevenson characterized as "a compellingly vivid account" of "the accident in my skull" (Hodgin's term).

Dimensions of Talented Behavior

Talent is an English word which stems from the Latin talentum (an ancient weight or money unit) and the Greek talanton (a balance, a thing weighed). Thus the word "talent" implies something of worth and an act of evaluation. Accordingly, initial reports from the Human Talent Research Program (McGuire & Associates, 1960; McGuire, Hindsman, King, & Jennings, 1961; McGuire, 1961a) employed the word "talent" to designate

> ... a pre-eminent aptitude, or a superior ability, either natural or acquired, or a capacity for achievement or success. In school settings, "human talent" refers not only to various kinds of scholastic aptitude and academic achievement measured by objective instruments and evaluated by teachers, but also to other forms of behavior appraised by one's age-mates and older people. Thus, talented behavior involves both personally-significant and socially-valued competencies, including signs of creativity, recognized as such through performances or products which can be assessed by other persons.
>
> The basic assumptions underlying the [HTRP] is that, if factors such as innate ability be held constant, talented behavior is acquired and becomes organized, or structured, and to some extent predictable, as a consequence of the educative process. Unless something out of the ordinary is done in guiding learning experiences, a process we term "telesis," the behavior of most individuals attains a kind of crude stability or invariance which makes it predictable (McGuire, 1961a, p. 46).

A talent, then is simply the behavior of an individual in a situation wherein the action (or performance) is evaluated within a framework of expectations. A talented person is not necessarily a genius, that is, "a person who does easily what no one else can do at all" (Gallagher, 1964b). Although MacKinnon (1962) has explored "The Nature and Nurture of Creative Talent," being talented does not require creativeness; that is, a thought or action "extended in time and characterized by originality, adaptiveness, and realization" (p. 485). From the point of view of school people, the underlying requirement for being talented is some degree of productive thinking (Gallagher, 1964a). After participating in the NEA Project on the Academically Talented Student (Aschner & Bish, 1965), the principal investigator of the HTRP commented upon a requirement for productive thinking:

> The individual who reacts as an effective person--gaining acceptance and maintaining action rather than by passively conforming--not only achieves-- . . . but also usually turns out to be a healthy human being (See "from the commentators..." on the back cover).

Intelligent Behavior Contrasted with Reflexive Behavior

When the foregoing comment was formulated, the writer took some time to express himself effectively; rewriting to achieve economy of expression and choosing words carefully to convey the idea of interpersonal relatedness[3] basic to encounters wherein reciprocal stimulation has a maximum impact. He was trying to convey with words a sense of active coping as a characteristic of the highly effective individual most capable of productive thinking. On the other hand his secretary, who also is capable of preparing letters and memoranda which invariably elicit highly favorable comments about her from others to the writer, simply "dashed off" the comment with much the same rate of speed she has used to type this illustrative paragraph laborously formulated on a "right-handed" IBM typewriter.

The first kind of behavior is what we have come to recognize, as intelligent behavior guided by central processes (Rowland & McGuire, 1968a, 1968b), which

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[3] The notion of "interpersonal relatedness" as a desirable outcome of reciprocal stimulation between Alpha and Beta(s) was contributed by Professor Robert F. Peck, perhaps without awareness on his part, during one such encounter.

Judd and his associates at Chicago termed "higher mental functions" (1936). The second kind is reflexive,[4] habitual, or cue-dependent, a secretarial capability acquired through training and experience. Her typing habits are a reflexive skill which she often incorporates into highly adaptive patterns of action (e.g., preparing the original masters for offset printing of this total manuscript). That surely is intelligent rather than reflexive behavior. Both kinds of behavior are responsive to adaptation to one or a combination of the three interacting environments--genetic, internal, and external (Muller, Little, & Snyder, 1947) wherein the dynamic equilibrium (Gerard, 1940a, 1940b) of a living organism is maintained.[5]

Parenthetically, D. O. Hebb's example in the recent edition of his Textbook of Psychology (1966) probably is more primitive to the point than ours, "A girl at a dance is cold; she shivers reflexively, but then goes on to get a scarf to put over her shoulders." The distinction he draws applies in both instances; namely, some behavior shows a close temporal relation between stimulus and response, and we can assume that it depends on straight-through connections in the CNS; other behavior does not show this direct relation, and we must assume the connections are not straight-through" (p. 83). Thus he differentiates between "reflexive or sense-dominated" and "higher behavior, dependent on mediating processes (ideas, thinking), which in his text are assumed to consist of the activity of cell-assemblies (p. 79)." Recently, Berlyne (1965) explained, "Russian psychologists use the word 'reflex' extensively, but they insist on distinguishing their 'reflexive (reflektorny)' point of view from 'stimulus-response psychology,' . . . For them, however, a 'reflex' is a stimulus-response association that is highly susceptible to modification by central processes, in accordance with the tradition launched by Sechenov and Pavlov" (p. 11). The reference is to the "second (verbal) signal system" (Brozek,1964). The fact is that Berlyne's "integrative neo-associationism" actually is behavioristic. His orientation is quite clear in the gratuitous omitted portion of the foregoing quotation, "having no less astigmatic view of the latter (S-R psychology) than many of their Western colleagues," but his preference does not prevent him from criticizing S-R psychology (pp. 8-9) and, particularly, "a failure to take account

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[4] The first term chosen was "sensible" from the Latin sensibilis to convey the notion of "sense-dominated" responses but Hebb's insistence that "sensory guidance" is an essential factor in all behavior (1966, p. 83) forced a reconsideration and the appropriation of his term "reflexive" used in the dictionary sense of "a habitual and predictable way of thinking or behaving." Notice that the reference is not to a "reflex arc" (Descartes' unit for the analysis of involuntary action) which John Dewey (1896) rejected as a psychological concept holding that "mediated experiences" were central psychological events organically relating stimulus and response. "Reflexive behavior" would include William James' "acquired habits" (1892 and 1961) as well as Pavlov's "conditioned reflex," his name for behavior that is learned and not inborn (Herrnstein & Boring, 1966, pp. 564-569).

[5] In his book, Unresting Cells (1940a) and an article during the same year in Scientific Monthly, Ralph W. Gerard held that "all living things are semi-closed systems, partially differentiated from, partially continuous with the environment that extends about them in time and space." "These systems, or organisms, manifest life's earmarks" (1940a, pp. 407-417): (1) they are in dynamic equilibrium (transmuting substances to capture energy and excreting wastes during metabolism); (2) they perform specific synthesis (a directed drift of the equilibrium, or a type of autocatalysis, which comprises the phenomena of reproduction and development, regeneration and repair); and (3) they manifest adaptive

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amplification (the active regulated effort of the organism to maintain its equilibrium or return to it when disturbed--a concept similar to Piaget's "equilibration"). In the remainder of Chapter 14 (1940a, pp. 417-425) and in the journal article (1940b) Gerard applies these concepts to a society, or epiorganism. Parenthetically, Barbel Inhelder has told us that, in addition to Piaget's views upon the biological basis for his theory of knowledge (1967b) wherein he considers a biological organization as an "open system," the Geneva group has been influenced by the work of a leading British figure in developmental genetics at the University of Edinburgh, C.H. Waddington, whose book was the first to bring together the subjects of embryology and genetics (1940) and who recently has provided a genetical interpretation of differentiation as well as an initial view of the processes by which structural organization may be brought about and maintained (1962).

of attentive and stimulus-seeking activities."

Similarly, Hebb's neuropsychological behaviorism did not prevent him from recognizing that the first half of "The American Revolution" (1960) in psychology, "to get the S-R formula taken seriously in all domains of behavior" had been accomplished." Then he asserted that the time had come to "get on with the next phase, attending to "an autonomous central process as a factor in behavior" along with "the subject's self awareness, his construct of personal identity," "his body image," and, in particular, "the serious analytical study of the thought process." Moreover, Hebb expresses a preference for the mediational postulate and would like to maintain translatability of terms with neuro-physiological conceptions (an adualistic approach). Nevertheless, he entertains possibilities such as Plan and Metaplan (Miller, Galanter, & Pribram, 1960) and even "schema-with correction" (Woodworth, 1938) much as Piaget uses the term schema (Which Sir Frederic Bartlett in 1958, p. 146, revealed had been suggested to him by a neurologist friend, Sir Henry Head) to designate an internal representational model. In addition to schema Piaget refers to scheme as the internal form of an operation or knowing activity, which when schemes are coordinated among themselves in what might be called metaschemes, underlie intelligent behavior (McGuire & Rowland, 1968).

Relation of Talented and Creative Behaviors to Central Processes Governing Both Intelligent and Reflexive Behaviors

Among the three central-process approaches, both Berlyne and Hebb think monadically--they choose the behavior of one person as their subject matter. But Berlyne also adopts a "genetic" point of view, tracing the course of development from which present behavior sprang. Only Piaget (1947 and 1966) speaks of "the interaction of the organism and environment" which leads to an "operational theory of intelligence" (p. 16) and "intelligent inquiry" as well as "social factors in intellectual development" (pp. 156-166). Then he suggests that "operational grouping presupposes social life," which involves a form of equilibrium of inter-individual actions," and "an interaction of thought between individuals." He adds, "with the acquisition of language, . . .new social relations appear which enrich and transform the individual's thought" (p. 158). But Piaget expresses certain reservations (pp. 158-159) which forced us to go back to Sears' 1951 APA Presidential Address for the initial dyadic model and to Judd (1936) for ideas about Education as the Cultivation of Higher Mental Processes."

Initially our focus upon talented behavior (socially-valued) contrasted it with creative behavior (original, adaptive, realized). Both are dependent upon the central processes which guide intelligent behavior (adaptive to the interaction of changing environments[6] -- genetic, internal, external -- which underlie the dynamic equilibrium not only of one's own behavior but also that of others with whom he interacts). For talented and creative forms of behavior, however, particularly in athletic, musical and artistic performances (where organic limitations play a role), the central processes have to act without hesitation at choice points in the governance of reflexive capabilities. The unforeseen interplay of posed problems we only now are beginning to understand! This chapter merely begins to open up what has been explored further in Chapters II to V.

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[6] Gerard's concept (in footnote 5), "partially continuous with the environment that extends about them in time and space" became "partially continuous with the environments that extend about them ..." In 1946-47, the principal investigator (CMcG) became responsible for the graduate course and seminars concerned about the biological basis of behavior for students in Human Development and the participating departments at the University of Chicago. Men such as Gerard, Strandskov, Paul Weiss, and R. W. Sperry were available for consultation. The shift in emphasis reflected a fresh conception of human individuality or variability as being ensured by three interacting environments operating throughout the life span of any "individual replacement" who becomes a member of a human society; namely, (1) the gene-controlled (where we now know that DNA and types of RNA are operating) or morphogenetic (form-determining), (2) the neuro-endocrine or internal (eventually "self" and "emotionality"), and (3) the nutritional-sociocultural-psychological or external levels of influence (Mueller, Little, & Snyder, 1947, especially pp. 70-108; but the remaining parts of these Messenger lectures at Cornell in the fall of 1945 maintained the same theme.

Genetic Epistemology, Central Processes, and Education

The "homework" done by Rowland and McGuire for the two HTRP reports as well as The Research and Development Center for Teacher Education has provided the background not only this and a subsequent section but also for the theory developed and the interpretations of HYRP analyses of data inchapters to follow.[7] In our latest published article upon central process theorists (Rowland & McGuire, 1969), however, we somehow neglected to refer to Hebb's evaluative closing chapter, "Alice in Wonderland, or Psychology Among the Biological Sciences" in Biological and Biochemical Bases of Behavior edited by Harlow & Woolsey (1958, pp. 451-467). Hebb encouraged us to identify and represent the most probable variable elements of central processes guiding the intelligent behavior of Alphas and Betas in our transformation of Sears' dyadic model (1951).[8] Hebb's language is straight to the point.

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[7] The references for Rowland during 1967 and 1968 as well as for McGuire from 1964 to 1968 inclusive, entered singly or in various combinations with co-authors or editors, may be found at the end of this chapter and are not cited herein unless the entry (e.g., Rowland & McGuire, 1969, on "central process theorists"), is to a reference not previously considered in early versions of the text. Delays in the actual printing process of a previously scheduled report (No. 1138) have enabled us to include pertinent references to 1969 publications. We owe a number of authors, editors, and publishers appreciative acknowledgements for prepublication copies of articles and books scheduled for release early in 1969. Thus the literature and interpretation of data in HTRP report No. 742 has been kept very much "up to date" despite the fact that the actual research data were obtained from 1957 to 1963 and the inital draft of this report was completed in May of 1968.

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[8] Sears' ideas were germinating during the Inter-University Conference on Child Development Research at the University of Chicago. The proceedings were edited by McGuire for publication in an issue numbered 2, March-June, Child Development, 1948, 19, 4-126, at a time when the S.R.C.D. publications were supported by grants made through the National Research Council and the Society's offices were at the Council headquarters, 2101 Constitution Avenue, Washington 25, D. C. Arnold Gesell was at that meeting and looked upon both Sears and McGuire as "young whippersnappers" for suggesting that child development involved the study of changes over time where several kinds of developmental processes were involved and that time itself (that is, "maturation" to Gesell) was merely a back drop against which transformations (growth, differentiation, integration, acquisition of learned behaviors and other functions) could be portrayed. Both Sears and McGuire, planning to move in 1949, sought a model to relate their work to the educational encounter. Sears' 1951 A.P.A. Presidential Address proposed a dyadic model. Sears' dyadic formulation also appeared in the policy statement for the new interdisciplinary Department of Social Relations formed in 1946 at Harvard, Toward a General Theory of Action (edited by Parsons & Shils, 1951, pp. 465-478, as "Social Behavior and Personality Development"). E. C. Tolman spent much of 1948-49 at Chicago (during the dispute regarding academic freedom at California Berkeley) and was at Harvard for the fall term of 1949-50 to participate in formulating Part 1, "The General Theory of Action" and to write Part 3," A Psychological Model," pp. 279-364, in Parsons and Shils (1951). Sears left a position as Professor of Psychology and Director, Iowa Child Welfare Station, to become Professor of Education and Child Psychology as well as Director, Laboratory of Human Development, Graduate School of Education, Harvard University in September, 1949. About five years after Sears had left Harvard to go to Stanford and his native state, Goethals (1958) published "A Theoretical Framework for Educational Research," giving credit to Sears for the theoretical conception, the concept of expectancy, and retaining the "peripheralist" representation of Alpha and Beta in dyadic interaction, but adding the concept of "the institution," recently restated in an essay upon Comparative Functionalism by Goldschmidt (1966, pp. 118-139). McGuire's 1958 "centralist proposal of a dyadic model,"updated to include reciprocal stimulation, expectancies in the central processes, as well as evaluation, appears in Chapter II, pages 2-38 to 2-44, of this manuscript.

> The day of out-and-out peripheralism seems over, but there is still a certain cramping effect of older ideas. One would think that a central-process postulate added to stimulus-response theory would be treated as a major item of business, worthy of extensive and thorough examination since its implications must affect the whole system of ideas. Instead, it seems regarded as Jane Austen regarded sex: something very important but not to be spoken of openly. Thus a thinker as acute as Bergmann refers with approval to a proposal by Berlyne that it is alright to deal with perceptions as long as they are called responses and not intervening variables, "though they do often intervene between the presentation of a stimulus situation and other *possibly more overt responses*" (*Ann. Rev. Psychol.*, 1953, 4, 435-58). My italics here draw attention to words that produce complete disbelief in me ... However, terminology is not of the essence; once we are clear about the meaning of terms, the important thing is that the peripheralist-by-preference and the central-process theorist do not differ fundamentally but only in emphasis.
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> Hedonism may be on its way out also. By this term I mean the position that identifies motivation with biologically primitive hunger, pain, and sex...Evidence recently reviewed (Hebb, 1955) shows that there is no escaping the addition of an exploratory-investigatory-manipulatory drive at the very least if we are to theorize in terms of discrete drives at all. The so-called exploratory drive has been known for some time, and the work of Harlow and his associates (1953) and of Bexton, Heron, and Scott (1954) shows that the scope of the investigatory motive is much broader than "exploratory" would imply . . . But there are many facts, disregarded so far by the hedonist, that are not comprehended even with this addition (p. 458).

Hebb closes with two thoughts which have guided the HTRP. First, he advises, "What we need from a theory is that it should hold together long enough to lead us to a better one" (p. 465). Second, he warns against the irresponsibility "of closing one's eyes to the existence of set and attention and purpose while making an endless elaboration of methodological notions that clearly have not paid off in the development of new knowledge..." (p. 466). Moreover, Professor Hebb probably would appreciate much of what Piaget has to say in his most recent book, *Biologie et Connaissance* (1967b), wherein Piaget demonstrates his theses (translated freely), "that cognitive functions constitute a regulatory central process governing interactions involving an organism and its environments" and that "the organism is both product and creator of its milieu by virtue of the ongoing, organized, and self-regulatory exchanges with its environments in terms of operations inherent in and characteristic of fundamental life processes."

In making the transition from Donald Hebb to Jean Piaget, we have deliberately linked central processes acquired in becoming and being human to "genetic epistemology," which is concerned with the development of knowledge-gathering processes and "education," which involves planned intervention into human development. Most American psychologists, educators and others concerned about the behavioral sciences have failed to realize that, to Piaget, genetic epistemology is a multidisciplinary area of inquiry wherein the investigator not only passively records an individual's responses but also actively explores the respondent's explanations of them (B. Inhelder in Kessen & Kuhlman, 1962, pp. 19-34)[9]. Instead of the causal-mechanistic framework of English empiricism, which underlies the passive "knowledge getting" of Skinnerian operant conditioning, Piaget has adopted an active theory of operative knowledge (see Figure 2 in Furth, 1968) wherein, to use Piaget's own words, "The instruments of our knowledge form part of our organism, which forms part of the external world" (Inhelder, op. cit., 1962). Furth (1967) has been critical of Americans who fail to diffentiate between Piaget's use of the French word scheme, which refers to an "operative scheme" (an internal "knowing activity") or a group of such schemes enriched by formal reflecting abstraction (Furth, 1969, pp. 248-252) that constitutes "operational knowing" in the active sense, on the one hand; and the French word schema which conveys a representational outline--

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[9] At the Carmel Conference, Feb. 9-11, 1969, following the A.E.R.A. meetings in Los Angeles, both Piaget and Inhelder called the active probing for a subject's explanation "la methode clinique." Persons who administer the Stanford-Binet, Wechsler, Rorschach, and TAT instruments also often are taught to question for clarification of responses to stimuli. Read Tuddenham, in his excellent appraisal of Piaget's work (American Psychologist, 1966, 21, 207-217),

or "figurative schema"--in contrast to an "operative scheme."[10] Moreover, our HTRP data indicate the existence of multidimensional cognitive operations during preadolescent years (McGuire, 1961a; also in Aschner & Bish, 1965, pp. 180-190; and 1967). These cognitive operations change their configurations during the phenomena of pubescence to yield a smaller set of operational schemes in early adolescence (see Tables 5.12 to 5.20 in Chapter V). Consequently, we believe our concept of active central processes guiding intelligent behavior and evaluating feedback ("**equilibration**") is consistent with Piaget's conceptions of "operational knowing" and "symbolic functioning" which he endorses in the Preface to Furth's new book on *Piaget and Knowledge* (1969). Therein Piaget writes "Philosophers . . . forget that no science is complete and that all knowledge is

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is the only American writer who seems to appreciate the value of "the methode clinique."

[10] In the 1967 article published in *Child Development*, Furth asserts "Ausubel's summary of Piaget refers indiscriminately to internalized actions as the source of thought as well as of symbol" (p. 821). Then he shows that Ausubel and other Americans appear to be **unaware** of the two aspects of cognition differentiated by Piaget; namely, (1) an **operative scheme**, "acting and transforming a reality state, the basis of **intelligent** understanding"; and (2) **figurative schema**, referring to the static configuration to supply the "symbolic-imaginative support for a knowledge that is directly focused on the figurative aspect of an object, for example, in spatial concepts" (p. 822). This use of "schema" plural "schemata" (Bartlett, 1958, p. 146) is the Head-Bartlett notion of "organized response groups "which arise from "stored results of past responses." Symbolic functioning includes both aspects of cognition; a symbol as signifier with figurative content. While symbolic functioning cannot be disassociated from human cognition a particular symbolic product (e.g., image, language) can be considered a supportive but not a constitutive element of operativity. Thus we would say that a symbol, as such, is not necessarily an element of the operative-transformational component of the developing central processes (which Furth and Piaget both verify as "the developing intelligence"). Here we have taken the crucial step of transforming an essence concept of "intelligence" into "central processes which, with sensory feedback, guide intelligent behavior."

ever in a state of transformation, hence of development" (p. vii).[11]

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[11] Piaget employs the assimilation-accomodation paradigm to explain human knowledge which, according to him (1967b), is essentially a construction that begins with the knower-known relationship. Assimilation implies a living structure, or central process, capable of "taking in" the discontinuities in one or more of an organism's three interacting environments; for example, (transforming Piaget's language to that of Hebb's 1960 A.P.A. Presidential Address), the discontinuities in "body image" precipitated by the presumable genetically-induced pubescent changes, the problems of "self-awareness" and discontinuities in emotionality (internal environment) brought about by "expectancies" regarding new cross-sex relationships in the emergent age-mate society (external environment). In accord with Piaget's principles that "all knowledge is ever in a state of transformation, hence of development, " the central processes accomodate to the discontinuities thus maintaining what Piaget terms "equilibration" in the biological organization. Thus assimilation and accomodation are cognitive functions of emergent central processes which not only regulate exchanges with the environments of an organism becoming and being human but also direct intelligent (adaptive) behavior "through control of an action pattern by continuous compensatory movements" (Furth, 1969, p. 71).

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CHAPTER II

THEORETICAL ORIENTATION AND RESEARCH MODELS

From the beginning of the Human Talent Research Program in 1957, members of the HTRP team agreed that they were undertaking a long-term inquiry into something more than the nature of various kinds of academic capabilities measured by objective tests and evaluated by teachers. In addition to school-related "talents," they focused their attention upon the development of personally-significant and socially-valued patterns of behavior and/or attributes, including transformations over time, occurring among girls and boys who attend junior and senior high schools in four different communities (McGuire, Hindsman, King, & Jennings, 1961). Members of the research group also were concerned about the antithesis of these patterns. The opposite side of talent is illustrated by limited repertoires of educational capabilities (Duke & McGuire, 1961) and socially unacceptable forms of behavior (Kelly & Veldman, 1964) which reduce the pool of "talent" in school and, later, in adult populations.

Instead of studying talented behavior developmentally, others explored diverse topics largely to test postulated relationships among variables for various subpopulations. For example, Reid, King, & Wickwire (1959) studied the cognitive and noncognitive attributes of boys and girls from different family backgrounds nominated for descriptions of creativity; i.e., "creative" vs. "non-creative," according to sex and family status. McBee & Duke (1960) reported a methodologically sophisticated demonstration of the additivity of measures of intelligence (CTMM) and scholastic motivation (Brown-Holtzman SSHA) in relation to academic achievement (GPA). Phillips employed HTRP data when he began his studies on anxiety (Phillips, King, & McGuire, 1959; Phillips, Hindsman, & Jennings, 1960; Phillips, Hindsman, & McGuire, 1960; Phillips, 1962). Pierce-Jones, Reid, & King (1959) confirmed propositions about cultural diversity in dimensions of cognitive, attitudinal, and psychomotor behavior suggested by Anastasi's book on Differential psychology (1958). The variations were interpreted in terms of differential access to socializing experiences for children from Anglo-, Latin-, and Negro-American families (84 in each subsample).

Access to the HTRP data and studies in the four Texas communities was not restricted to members of the original research team. Boys and girls in the HTRP locations were one of the populations employed by Holtzman and his colleagues to standardize two forms of the Holtzman Inkblot Technique (HIT) reported in their book upon Inkblot perception and personality (1961). Peck and Galliani (1962) demonstrated that adolescent assessments of one another with reference to nine social and psychological roles exhibited reasonable concurrent validity. Intelligence (CTMM) was socially valued in nominations for pertinent role assignments (e.g., "brain," "wheel," "big imagination"). No significant halo effect was manifested. On the other hand, age-mates with below-average intelligence were not routinely assigned to "quiet one," "left out," or "wild one" roles. Ethnic factors, however, decidedly biased peer judgments of one another in culturally diverse communities. Anglo boys and girls were more likely to be named to any role than were the Latin; strangely, the Latin-Americans apparently ignored youth of their own ethnic extraction in making their nominations.

Looking back upon the initial publication from The Human Talent Research Program (Hindsman & Duke, 1960), a reader quickly realizes that the HTRP did not begin with a full-blown theory of talented behavior and a master design for the study of the development and utilization of human talent.[1] The original research group, named on page 108 of the Hindsman-Duke article, represented as many points of view as there were individuals. They recognized, however, that there was a difference in emphasis and approach, not a fundamental contradiction, between emerging neobehaviorist and cognitive views of human behavior. Moreover, they agreed upon a research strategy which was multivariable, naturalistic,[2] and developmental in nature. By definition, developmental research focuses upon antecedent-consequent relationships (Sears, 1951), and the study of changes over time where time itself is not necessarily the variable of major concern, but serves as the backdrop against which transformations may be projected.

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[1] The development and utilization of human talent was one of the foci of educational research recommended by the Research Advisory Committee to the U. S. Commissioner of Education (Dr. Lawrence W. Derthick) for the Cooperative Research Program which finally was funded with an initial appropriation of $1,000,000.00 in 1957. The enabling legislation which permitted the United States Office of Education to enter into jointly-financed arrangements with universities and colleges or state education agencies to undertake educational research was Public Law 531, passed by Congress in 1954. Cooperative Research Project 025 was initiated in February of 1957 (McGuire & Associates, 1960).

[2] When relevant data had been gathered for subjects in sample populations and appropriate statistical analyses allowed valid inferences to be drawn (as in Chapter 4), naturalistic studies permitted what Campbell & Stanley (1963) later designated as "quasi-experimental designs." As shown in a report upon the dimensions and criteria of talented behavior (McGuire, Jennings, Murphy, & Whiteside, 1968), the approach permits validation as an outcome of what Campbell & Fiske (1959) term "validation by the multitrait-multimethod matrix." Values assigned for nominations from age-mates as well as from teachers together with scale scores representing responses to instruments complement one another. They define both the criterion factor variables in the twelfth grade and the "factors in persons" employed as predictors for the ninth grade.

The first HTRP project was initiated with the knowledge that one of the then new high-speed computer installations would be available in the academic year 1957-58. Few if any members of the research team, looking forward to relief from long hours at the desk calculator, anticipated the changes in theoretical approach and in ways of doing research brought about by the development of computer technology. The first section of this chapter provides some indication of the changes in the HTRP linked with what Green (1966) has termed "the computer revolution." Next, the ambiguities surrounding and the dilemmas created by viewing and studying human talents developmentally are considered in the light of pertinent literature. This leads to an examination of conceptions of human abilities. Then a simple context approach to understanding the formation of personalities and the development of valued and disvalued capabilities clarifies the assumptions underlying a dimensional model for research in human talent. Both the dimensional model and a catalytic model, which can be used to represent variables that bring about changes over time, have mathematical formulations wherein elements correspond to one another.

The Computer Revolution and the HTRP

The wealth of data and ideas to be tested, combined with the availability in 1958 of an IBM 650 computer to eliminate tedious hours of punching desk calculators, prompted further exploration of factor analytic methods (Fruchter & Jennings, pp. 239-265, in Borko, 1962). McGuire (1961b) combined analyses of variance and factor studies with a multiple regression approach. He undertook a series of tests of the proposition that sex role and school location have a moderating influence upon the observed performances of junior high school students on both cognitive and noncognitive instruments when family background and mental function are taken into account. Looking back now, with distinctions drawn by Harris (1963, p. 139) in mind, Table 3 in the article actually reports a "component analysis" (analysis of the data in hand). Moreover, the sources of variation employed in the ANOVA studies should be interpreted as "markers" of different patterns of cultural stimulation and probable learning experiences. In other words, the response capabilities of boys and girls completing their first year in junior high school vary in different subgroups of a total population.[3]

In addition to response capabilities elicited by cognitive (performance) and noncognitive (personality) instruments, members of the HTRP population at each school location evaluated one another in terms of nominations for 46 brief descriptions of behavior (see Appendix A). The 46 sociometric or nomination variables employed in the HTRP were analyzed by Hindsman (1960) who found five factors common to boys and girls (peer acceptance, negative model value, social effectiveness, deviant behavior, and quiet dependency) and five specific to each sex. Regressions of the sociometric factor variables upon 40 cognitive and noncognitive attributes not only indicated construct validity but also demonstrated that some underlying frames of reference probably are operating when age-mates assess one another.

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[3] Tables 5.4 and 5.5 in Chapter V represent the resemblance or average degree of similarity among individuals classified alike when they respond to cognitive and noncognitive instruments, respectively. The coefficients of resemblance actually are intraclass correlation coefficients (r_I) computed from the original mean squares for analysis of variance. One consequence of this study of HTRP data is that hypotheses derived from theory in Chapter IV to explain the transformation of personality attributes in early adolescence are tested separately for boys and for girls. In addition to taking account of the often-found differences in correlation matrices for the two sexes by regarding sex role as a moderator variable, the multiple regression analyses appearing in the Statistical Appendix to Chapter IV pay due attention to the probability that relationships among and between variables may vary not only in different subgroups of the HTRP population but also in terms of response biases.

The "know how" necessary to design and carry out multivariable research required time and experience to build up in the Laboratory of Human Behavior. Prior to the HTRP, the Laboratory housed the Textown Study of Adolescence (McGuire, 1956a) and Mental Health in Education Project (Peck & McGuire, 1959). Members of the HTRP staff had numerous opportunities to work and consult with Bottenberg & Ward when they were formulating their technical report (1963) upon the application of multiple linear regression to the formulation and analysis of research problems. Stimulated by the first of Rao's two valuable books (1952, 1965) multivariate procedures had been employed earlier in prediction studies (Brown, Holtzman, & McGuire, 1955); and, later, McGuire (1956b) reported a "sweep out" method of obtaining partial correlation coefficients in multiple regression problems. With the advent of high speed computers, Jennings (1963) investigated cross-validation in multivariable prediction using HTRP data to test his ideas and developed a subroutine system for data processing (1964).

The construction of a University Computation Center with a CDC 1604 installation[4] permitted procedures to be carried out from start to finish by a computer with no human intervention. System control cards that give routine instructions to the computer, together with an appropriate program (which calls forth the aforementioned subroutines as required) direct operations upon the original data (either on data decks or called from storage tapes). If the same computer algorithm (formal statement of a procedure) is employed with the same data by anyone else, the same results will be obtained. Consequently, by definition, the procedure is objective

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[4] The CDC 1604 system has been replaced by a CONTROL DATA 6600 installation with satellite stations on the campus of The University of Texas at Austin. When a CDC 6060 remote calculator is used as the "control box" at stations in this system, problems can be communicated directly to the 6600 computer and receive an immediate answer, all in a RESPOND system.

(Green, 1966). To compute the values necessary for drawing statistical inferences, formulations of procedures found in various texts (e.g., Cooley & Lohnes, 1962; Dubois, 1957; Anderson, 1958; Rao, 1952, 1965) often are not in a form suitable either for machine computation or for the problem at hand. An article by Jennings (1965) illustrates the modifications necessary to adapt a regression program to compute partial correlations directly rather than by hand from computer output.

Meanwhile, an EDSTAT library of general programs for statistical analysis has been built up as an outcome of HTRP, Personality Research Center, and current activities of the R & D Center For Teacher Education (Veldman, 1962; 3rd ed., 1965; publication in book form, 1967). George McBee, for example, worked out the original ANOVA program for use with the IBM 650 to analyze Phillip's data (1962) upon sources of variation in school achievement. For his study of factoral dimensions of creativity, Spector (1963) employed the ABSTRAC program developed by Jennings & Veldman (1962) to carry out the eleven factor (component) analyses and to obtain factor scores for 771 subjects in his research. Then he had to develop an extension of a two-way FACMACH program for three-way factor matching and series-matching to identify common dimensions across subsamples of Ss drawn from the HTRP population. To explore the use of canonical correlational analysis as a means of relating twelfth-grade criterion factor variables to antecedent seventh-grade predictor variables, Jones (1964) worked with Professor Veldman in the adaptation of procedures (now EDSTAT program CANONA) outlined by Cooley & Lohnes (1962, pp. 31-59) and Koons (in Borko, pp. 266-279). Work upon another multivariate procedure, discriminant analysis, resulted in procedures (now EDSTAT program DISCRIM) for two prediction studies of delinquency and school dropouts (Kelly, Veldman, & McGuire, 1964) complete with cross-validation data. Finally, working upon an entirely different project which eventually led to a proposal for the computer analysis of personality now underway, Veldman, Peck, & McGuire (1961) developed a generalized method for identifying the individual construct systems employed by judges who assess human behavior. Clearly, the computer revolution has encouraged theory building and broadened the scope of research models available to the Human Talent Research Program and its associated undertakings at The University of Texas with their concurrent apprenticeships for graduate students.

Dilemmas of a Developmental Approach to the Study of Talented Behavior

In August of 1960, The American Psychologist published a Bingham Memorial Lecture by Dael Wolfle (former APA Executive Secretary and retired AAAS Executive Officer) which advocated the development of a diversity of talent. Consequently, one might readily assume that the study of talent as valued behavior would be an acceptable focus for research in child and human development. Unfortunately, in the behavioral sciences of the mid-twentieth century, the study of talent has become an ambiguous area of inquiry.[5] A behavioral scientist who sets out to formulate reasonable schemas and to test propositions that follow from a conception of human talents as products of developmental changes in behavior has to resolve a number of dilemmas which currently block communication. First, there are the residuals of the nature-nurture controversy of the early 1930's. At that time, the prevailing concept held by psychologists, social workers, and educators (not to mention laymen and members of the medical profession) was that intelligence is a fixed individual characteristic. One corollary was that abilities (what one "can" do) are biologically predetermined and not culturally influenced. As indicated in the preceding chapter, Hunt's Intelligence and experience (1961) is an effective summary of evidence contradicting such beliefs. Although some educated people still cling to them, the assumptions of fixed intelligence and predetermined development no longer are accepted premises underlying a majority of the decisions about the educational process in the United States.

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[5] In general, references to the topic of talent seldom can be located in the subject indexes of either Psychological Abstracts or the Annual Review of Psychology, founded in 1927 and 1950 respectively. In fact, the book upon Talent and Society: New Perspectives in the Identification of Talent prepared by McClelland, Baldwin, Bronfenbrenner, & Strodtbeck (1958) as a report of a Committee on the Identification of Talent formed in 1951 by the Social Science Research Council is a case in point. To locate a reference to the book in the Abstracts, one consults the 1959 Index Number and is referred from "Talent (See Skill)" to "Skill, & Society, 581" which takes the reader to an entry in the February issue which could have been located originally if the seeker had known about the volume and scanned the entries under "Complex Processes and Organizations" to find the abstract on page 59. In the Annual Review of Psychology, however, the searcher does not find any assistance in the Subject Index of the 1960 volume. There is an entry (119) under "Literature Cited" in the chapter upon "Developmental Psychology." A terse reference (p. 442) to a report upon research (Ch. IV in the book, written by Strodtbeck) could have

Talent Identification Versus Talent Development

A second dilemma stems from the existence of two paradigms which shape conceptions of thought and implicit assumptions about the nature of human talent(s); namely, the mineral model versus the agricultural model. Most of the English-speaking world has employed the mining approach, the emphasis being upon the identification of talent and the implication that "talents" are to some degree inherited or

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been found eventually if one had looked up all entries in the "Author Index" for McClelland. In other words, "talent" is not one of the rubrics of major concern to the main stream of psychological research in the U. S. A. One should note, however, that "talent identification" was the focus when the Committee was formed in 1951 and the report was published in 1958. Nevertheless, by 1960, another member of the SRCD Committee (Dael Wolfle) was speaking in terms of "a strategy of talent development."

at least inborn. To illustrate, within the past decade, the Social Science Research Council had received the previously footnoted report from its Committee on Identification of Talent (McClelland et al., 1958). Neither that report nor John W. Gardner's discussion of "the search for talent" in his treatise on Excellence (1961, pp. 46-53), however, accepted the premise of inherited talents. For example, Gardner writes, "I am concerned with the social context in which excellence may survive or be smothered" (1961, p. xiii). McClelland et al (1958, pp. 1-28) begin their volume with a discussion of issues in "the identification of talent" but, in the concluding chapter, assert that "basically ability refers to the adaptiveness of behavior" (p. 235) and that "the 'talent' is in the combinations of a particular person with a particular situation" (italicized, p. 236).

The alternative view, a developmental approach, naturally leads to an emphasis upon the cultivation of talents during the early years of schooling providing there is an appropriate cultural milieu. Strange as it may seem, the USSR has had the necessary climate for such a view of human talent to take effect. In the Soviet Weltanschauung, by offical decree, the belief is that there are no inherited differences among individuals. Officially, individual differences are recognized only when there is brain damage or a comparable insult to the otherwise intact human organism which brings about malfunctioning. This belief in innate equality leads to an explanation of differences in performance by attributing them to motivational factors as well as to inequalities in prior experiences. According to observers, the approach seems to be effective. For example, Professor Urie Bronfenbrenner (1962), after a visit to the Soviet Union, reports that the assessment practice of Soviet educators, wherein they evaluate the performance of each child on the basis of how well his group does as a whole, appears to have positive outcomes. Moreover, the ones who learn most readily in the groups, which are formed in elementary classrooms on a random basis, apparently spend a great deal of time and energy helping other members. Thus they act to maximize group performance and thereby their own grades. Nevertheless, Bronfenbrenner believes that, in the future, Soviet students of human behavior are going to pay less attention to conscious processes (p. 82) and more to studying the process of socialization as well as mechanisms of social control. The impetus, he forecasts, will come from increased concern about providing "the most favorable conditions for the education and communist upbringing of the rising generation" (p. 80).

Assumptions Underlying National Policies re Human Talent

The ambiguity of approaching human talent(s) as either a matter of identification or of cultivation becomes even more complex when ideologies and national policies are considered. In the Soviet Union, the official point of view is that inherent differences among individuals with intact organisms are non-existent. For all intents and purposes, the view was made official by decree on July 4, 1936. Brozek, in his thorough interpretive review of developments in Soviet Psychology (1964), infers that a process of "de-Stalinization" has been taking place in Soviet scientific as well as political life. Consequently, Soviet psychologists are beginning to criticize their colleagues for too narrow an interpretation of the 1936 decree against "tests" which resulted in a neglect of the study of individual differences among children. One of the casualties appears to have been Vygotsky's seminal 1934 monograph on Thought and language which has been translated (1962) and made available as a paperback in English.

On the other hand, the assumptions which underlie American education--the idea that man is potentially good and that this good can be brought about by equality of educational opportunity--represent a faith in the principle of the perfectibility of man. This belief, in turn, "implies the ability of all to learn, and the duty of society to teach" (Keppel, 1966, p. 11). To maintain these ideals, and for some to reconcile their mode of thought with the emergent Zeitgeist discussed in the introductory chapter, English-speaking peoples have employed at least two convenient fictions; namely, concepts of alpha- as well as beta-intelligence, together with the substitution of equal treatment for equal opportunity.[6]

Convenient fictions of the English-speaking peoples. - The fictions about intelligence and equality stem from customary ways of representing thoughts, feelings, values, and actions in the past. The two sets of concepts have become interrelated over the years and relatively few persons stop to examine the assumptions implicit in the language usages which carry over from earlier world-views. With reference to alpha- and beta-intelligence, Donaldson (1963, pp. 6-7) inadvertently but succinctly demonstrates the difference between potential (A) and realized (B) intelligence. She shows that the ambiguity of the English "he cannot swim" is clearly differentiated in the French il ne peut pas nager (because of lack of potential, a radical incapacity) from il ne sait pas nager (because he has never learned, never realized his potential for achievement of the skill). The custom of associating "innate" or "native" with "potential" and the retention of language usages from the past without reflection upon implicit assumptions are illustrated in a form from a graduate school requesting evaluation of "native intellectual ability" of a student seeking a grant-in-aid to continue his education. The evaluator usually realizes he is being asked to make a judgment about probable quality of future intellectual performance and responds accordingly. The substitution of equal treatment for equal opportunity has been depicted most succinctly in Who shall be educated? by Warner, Havighurst, & Loeb (1944) in a chapter entitled "Curricula--Selective Pathways to Success." They comment somewhat ironically upon the reaction of people in Hometown against a differentiated curriculum in the high school, "The democratic way seems to be to give everyone the same educational opportunities--the same as required for those at the top; namely, college preparatory courses" (p. 69). The three Chicago behavioral scientists recognized the potentialities present in emerging high schools of the "comprehensive" type some years prior to the Conant report upon The American high school today (1959 and 1964, pp. 21-47). In such schools, all students have a common "core curriculum" (usually English, Social Studies, Physical and Health Education, perhaps some form of mathematics, and sometimes a science) supplemented by individual electives, but no hard and fast divisions into college preparatory, business, and other programs.

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[6] After formulating the concept of convenient fictions used by English-speaking peoples, independent presentations of each idea were encountered but the authors did not interrelate them as part of a linguistic Weltanschauung, or perception of reality associated with a language. Margaret Donaldson (1963, pp. 1-9) argues "we cannot prove that the development of intelligence is a process of inevitable unfolding" yet we differentiate between Intelligence A (innate capacity) and Intelligence B (developed intellectual power). Paul Komisar (1966) examines the "two faces of equality." Then he goes on to argue the specificity of equal treatment and the generality of equal opportunity to "solve" the seeming paradox of equality in schooling. Diaz-Guerrero (1967) employs the term "sociocultural premise," or assumptions upon which members of a given group base their thinking, feeling, and acting, in the sense that "convenient fiction" is used herein.

Language usage: growth and/or development? - The approach to the study of change over time in the HTRP has been to assume that "growth" is subsumed in the notion of "development." Furthermore, the use of the two terms together, as in "human growth and development" (often encountered in teacher education), involves a redundancy. As indicated earlier, the focus of the HTRP has been upon studying "the development of talent." In a somewhat analogous inquiry into the nature of cognitive development, however, Bruner apparently elects to use "growth" to represent transformation to a more developed or more mature stage; for example, "The course of cognitive growth" (1964), "The growth of mind" (1965), and a book with collaborators on Studies in cognitive growth (1966). Nevertheless, in the preface to Studies, Bruner describes the focus of work at the Harvard Center for Cognitive Studies as "exploring the course of cognitive development!" (1966, p. x). Parenthetically, in their Dictionary, English & English (1958) point out "Originally development, as a qualitative phenomenon, was distinguished from growth as quantitative or incremental." They continue "present usage tends to make development inclusive of growth or to employ them synonomously" (p. 148). They note that the distinction is not well observed and indicate a preference for the term "development" to refer to "change toward a more developed or mature state" (p. 233) instead of "growth" which has no adjectival form, as in "developmental psychology."

The Multidimensional Nature of Human Abilities

In their report for the Committee on the Identification of Talent formed by the Social Science Research Council in 1951, McClelland and his associates (1958) initially concentrated upon values and motives (the non-academic determinants of achievement) as well as social skills and occupational status (the non-academic types of achievement). For the report, however, Baldwin prepared a chapter upon the role of an "ability" construct in a theory of behavior (pp. 195-233). He started with the notion that any ability attributed to a person reflects what he can do. In the language of this chapter, the behavioral capability is a precondition to running a four-minute mile. Nevertheless, whether or not a runner attains that performance in any given race depends upon other factors--cognitive (planning), situational (conditions), and motivational (incentives).

In general, cognition (knowledge-ordering behavior) integrates a multitude of sensory cues (sorting information from error) and provides an internal "schema" to guide motoric actions without having to rely upon external guiding cues. Accordingly, Baldwin (p. 231) concludes that an ability linked with cognitive guidance does not necessarily depend upon any single sensory cue for feedback; for example, compare one's movements in his own dark bedroom (cognitively mapped) and in a strange darkened hotel room! Contact with one object whose relation to others in one's own room already is known permits a person "to place" other objects in the familiar room. Guidance provided by external sensory feedback, in a new or changing situation, however, permits adaptive behavior under shifting conditions. Finally, Baldwin recognized three sources of correlation between abilities; namely, identical behavioral components, intrapersonal patterning, and cultural expectations (again in the language of this report).

Adaptation of Ferguson's Theory of Human Abilities

The foregoing conception of an "ability" construct differed from but also bore similarities to the notions about "ability" guiding the HTRP when it was proposed in 1957. The original proposal had been strongly influenced by Ferguson's conceptual framework (1954, 1956) linking the study of human ability with the study of human learning and the concept of transfer. The main points of Ferguson's theory fitted with and provided a reasonable explanation of prior observations in school settings and experience in research (McGuire, 1945, 1949, 1956b):

(1) The abilities of man are attributes of behavior which, through learning, have attained a crude stability or invariance not only in the adult but also in childhood and adolescence. This statement holds true unless an individual encounters learning experiences calculated "to make a difference" in his or her behavioral capabilities. In the initial proposal, which had to be modified when funds could not be provided for necessary personnel, the planned intervention were termed educational teleses (Hindsman & Duke, 1960).

(2) Biological factors in the formation of abilities fix limiting conditions. Parenthetically, the notion of three interacting environments advanced by respected geneticists in the Messenger Lectures on the Evolution of Civilization at Cornell University (Muller, Little, & Snyder, 1947) provides a reasonable heuristic device (i.e., peg for one's thoughts) to replace the heredity versus environment distinction. Three levels of environmental influences operate from conception until death to determine the development and individuality of human beings (pp. 89-108); namely,

(a) the morphogenetic or gene-controlled environment which is a compromise between the two gene systems present (female ovum, male sperm) at the conception of an individual human replacement.[7] Although behavioral scientists have been unable to devise means for the assessment of potential (pp. 2-12 and 2-13 re "convenient fictions"), the view is widely held that "the genes fix limits, perhaps rather broad, of potential intellectual development" (Ferguson, 1965, p. 40).

(b) the internal or neuro-endocrine environment initiated when placental hormones take over some developmental-control and regulatory processes earlier mediated by nucleus-cytoplasm and cell-cell interchanges. Morgan's third edition of his Physiological psychology (1965) has clear accounts of neuronal physiology and the internal environment (pp. 61-108) as well as emotionality and other behavior (sleep, arousal, activity) associated with a reticular activating system (RAS, pp. 41, 347-348) which may be linked to motives as "affectively toned associative networks" (McClelland, 1965). Psychological theories depict these internal elements of human behavior in terms of concepts such as self, cognitive structure, ego functions in relation to id and superego, habit family hierarchies, and personal constructs.

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[7] Since Linus Pauling won a Nobel prize in 1950 for work upon the atomic structure of protein, research has shown that a gene is a segment of deoxyribonucleic acid (DNA) which carries the blueprint for making new proteins. Ribonucleic acid (RNA), occurring as nucleotides in the cytoplasm of cells as well as in the form of "messenger" and "transfer" RNA's, evidently provides a bridge between DNA master molecules and proteins formed during the life cycle of living organisms (Beadle & Beadle, 1966, pp. 180-191). Nevertheless, subsequent research does not substantially contradict the late Professor Muller's account of "the work of the genes" in the 1947 book (pp. 1-65), including the operation of nucleoprotein and nucleotides (which he regarded as essential agents for transfers of energy in living systems).

(c) the external or nutritional-social psychological environment which, prior to the mediation of cultural influences by parents, age-mates, and adult authority figures such as teachers, begins with the womb of the mother prior to birth. The Beadles have a highly readable chapter upon "Man's double inheritance"--biological and cultural (1965, pp. 42-46)--wherein they conclude, "We owe our evolution as much to our ability to develop, pass on, and modify patterns of behavior as to our physical inheritance as individuals," a view complemented by Bruner (1965) in his presidential address to the American Psychological Association.

(3) Cultural patterns prescribe what shall be learned and at what age different competencies are expected of girls and boys. Ferguson (1956, p. 129) supports this element of his conceptual framework by reference to a doctoral dissertation completed at McGill in 1955. Children reared in comparatively isolated environments displayed patterns of abilities which differed markedly from those reared in urban centers. For example, in the relatively isolated

outport communities of Newfoundland, certain perceptual and motor abilities were highly developed, with verbal and reasoning abilities suffering in comparison. Moreover, there was considerable retardation in abstract thinking and concept formation. Clearly, the abilities of man are not culture free; variations in environmental expectations lead to the development of different ability patterns. Apparently this statement does not contradict the views of contemporary students of behavior genetics who prefer "population" to "typological" thinking (Hirsch, 1967) and who are coming to appreciate an interactional approach (Glass, 1967).

(4) Abilities emerge through a process of differential transfer; that is, change in one set of capabilities goes along with change in another (concomitant change). Suppose that $\underline{x}$ and $\underline{y}$ are performance measures of two tasks which are believed to represent abilities, and t_x along with t_y represent amount of practice in them. Then a four-variable model for transfer can be written,

$$y = f(x, t_x, t_y),$$

which means that performance on one task is some unspecified function of performance on another task as well as the amount of practice on each. The simplest transfer function, $y = f(x)$, depicts concomitant changes in two measures of performance which are regarded as representations of underlying abilities. For example, observe a young child talking while playing and "placing" objects relative to one another--"this goes here and that goes there," or, more likely, "zis goz here"--looking to mother or to you for confirmation. Later, the same child may learn, either in exploratory behavior or through guided discovery to utilize the "placing" capability necessary to spatial relations in attaining a temporal concept, "This comes before that." Placing (spatial?) and verbal capabilities apparently facilitate the acquisition of further abilities.

Basing his generalizations upon Fleishman's studies of the factor structure of the learning task as practice continues (e.g., Fleishman & Hempel, 1954), Ferguson infers "the abilities involved at one stage of learning differ from the abilities involved in another," thus supporting the hypothesis of differential transfer. In the Fleishman experiments, largely involving spatial, verbal, psychomotor, and habituated psychomotor response patterns, specific or "within task" factors sometimes accounted for a large proportion of the variance. For example, in a complex tracking performance, no more than twenty-five per cent of the variance could be explained in terms of identified ability factors. The progressive changes in the pattern of skill factors or abilities, which often seems to involve the emergence of specific capabilities,[8] may be a reason why psychometric prediction of trainability or job performance has had limited success.

(5) The concept of a general intellective factor, and the frequency with which substantial correlations are obtained between many psychological tests, can

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[8] Capability has been employed in psychology to represent "the maximum effectiveness a person can attain with optimum training" (English & English, 1958, p. 1). This report, however, follows current usage (e.g., Gagne, 1962, 1965a, 1965b) and infers the acquisiton of response capabilities when a change in performance marks an individual's behavior in a given stimulus situation and the change persists over a period of time. The English word, capability, stems for the Latin root, capax and capabilitas (v. capio). Perhaps the shades of meaning may be conveyed by contrasting non capax mentis (not intellectual capable) with non compos mentis (not mentally composed) where the added dimension is the absence of smooth, effective functioning of the cognitive processes.

be explained by the process of positive transfer. Ferguson adds a corollary to his proposition that, through learning, "behavior becomes organized, or structured, and to some extent predictable"; namely, "the distinctive abilities which emerge in the adult in any culture (are) those that tend to facilitate rather than inhibit each other." He adds, "Learning itself is viewed as a process whereby the abilities of man become differentiated, this process at any stage being facilitated by the abilities already possessed by the individual" (1956, p. 121). Neither in the early formulations of a theory of learning and human abilities mediated by differential transfer (1954, 1956) nor in his recent review article (1965) does the McGill professor recognize the probability of facilitation by a set to learn (Harlow's "learning how to learn," 1949).

In his review chapter on "human abilities," however, Ferguson (1965, pp. 50-51) clearly is aware of Harlow's concept of learning sets and their significance for the issue of whether or not intelligence is fixed (Hunt, 1961, pp. 77-82). Moreover, he closely examines the "ingenious investigations" of Gagne & Paradise (1961) where performance apparently depends more upon immediately subordinate learning sets than upon specific basic abilities. Then Ferguson goes on to illustrate the provocative lines of inquiry relating human abilities, learning, and transfer in the general area of research carried on by Gagne and his associates.

Gagne's hierarchical formulation of "the acquisiton of knowledge" is based upon the notion of transfer from previously acquired, relevant learning sets (1962). The model may be useful for the conceptualization of emergent human abilities regarded as talents when they are socially valued. Beginning with subordinate capabilities (for example, symbol recognition, recognition of patterns, and number sense in the illustrative hierarchy, pp. 369-363), the reported experimental predictions and results obtained by Gagne and his coworkers would lead one to believe that learning to perform a given task becomes a matter of transfer from component learning sets to "a new activity which incorporates the previously acquired capabilities" (p. 364).[9] Like Ferguson (see p. 2-18), Gagne (1962, p. 363) is aware that an analogy may be drawn between his model and the findings of Fleishman & Hempel (1954) regarding motor tasks. Learning within a hierarchy seems to depend upon learning sets just previously acquired and not so much upon a basic factor or specific ability predictive of the ultimate performance.

Human Talents as Sets of Behavioral Capabilities

The foregoing discussion of an "ability" construct has ranged all the way from overlearned patterns of behavior (e.g., verbal or motor abilities) which tend to vary from one culture or subculture to another, through task (or job) performances that require the emergence of specific capabilities, to the acquisition of knowledge (i.e., cognitive abilities, structures, or schemata). Any distinction drawn among cognitive, instrumental, and motor abilities would appear to be arbitrary and based upon classifications of the tests employed as criterion measures.[10] The common element in human abilities seems to be behavioral capabilities which appear to be subordinate, coordinate, and superordinate to one another in the hierarchies that make up talented behavior. In the HTRP, these capabilities were indexed by test performances, scale scores for attributes, and sociometric valuations elicited from teachers and age-mates. The subordinate capabilities may range all the way from relevant learning sets (e.g., symbol aptitude, pattern recognition or closure, and number sense in Gagne's model, 1962), through "advance organizers" which apparently facilitate integration of new material into an existing "cognitive structure" (Ausubel, 1960, 1963), to the biological or physical capabilities necessary for specific kinds of athletic, musical, and artistic talent.

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[9] In his 1965 article for The School Review, Gagne draws a clear distinction between two different kinds of learned capabilities; namely, concept learning (acquiring a common response to a class of objects varying in appearance) and principle learning (combining concepts into entities referred to as "ideas," "facts," and "rules" as well as "principles"). He also differentiates between discovery learning and reception learning, the active and passive modes respectively of learning principles. The two modes, and their ties to real or vicarious experiences, may represent the difference between "knowing that" (uncovering a principle for one's self) and "knowing about" (receiving information linking concepts together to form principles).

Models for representing sets of behavioral capabilities. - To explain the ways in which factor analysis can contribute to psychological theory, Guilford (1961) described three models for representing ways of functioning within and among individuals. Like Allport (1937, 1966), Guilford refers to "traits" (inclusive of abilities) as relatively enduring ways in which one person differs from others. To avoid the fallacy of misplaced concreteness, however, the HTRP preference has been for qualities that discriminate among persons and what persons "can do"; namely, personal attributes and behavioral capabilities (represented operationally by values assigned for responses to psychological scales, sociometric valuations, and psychometric instruments).

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[10] During the HTRP years, and during a CVA-enforced period of learning--not by doing--but by thinking about what we had done and pondering the meaning of the HTRP data in relation to relevant theory and research reported by respected behavioral scientists (in print, in unpublished manuscripts, and in personal communications), the principal investigator (CMcG) began to realize how bound up we have become with discipline languages. One corollary of this state of affairs in the behavioral sciences is the extent to which inquiry has become channeled by "laws of allowed witchcraft" which specify preferred research designs (usually contrived experiments wherein the E apparently believes "instant culture" can be established by giving instructions or having a confederate participate) and modes of statistical inference (sophistication about analysis of variance being expected of today's research people). Here a bias shows. The HTRP is an example of longitudinal naturalistic research and, although ANOVA and factor analysis have been employed to order data and draw statistical inferences, they both are special cases of applied multiple linear regression--the method of choice for explicit statements of hypotheses and testing them while taking covariables into account. See Appendix B for a statement of "Methodology."

(1) Dimensional model. - To the extent that an individual's ways of functioning can be accounted for in terms of a limited number of common factors, each person can be represented by a point in n-dimensional space. Guilford's example (1961, Fig. 1) is a dimensional model with three axes which have as their point of origin (intersection) the center of a sphere. The axes are linear dimensions representing a unique trait, or common factor, along which individuals have characteristic positions reflecting individual differences. For example, individuals P and Q each are described quantitatively by their projections upon the three axes. The orthogonal (right-angled) projections define points which are each person's characteristic position in this 3-space. Guilford is quite aware of intraindividual differences from time to time and, consequently, uses the term "characteristic position." He suggests that persons who find difficulty in conceiving of a space with a large number of dimensions (hyperspace) should think instead of a profile chart in which the dimensions are laid side by side. For example, in an early HTRP report to an ETS Invitational Conference on Testing Problems, McGuire (1961a) reports seven factor variables for "highly intelligent" HTRP preadolescents with factor loadings and partial correlation coefficients (beta weights) for "indicators of talented behavior" (i.e., Guilford's "traits" or HTRP "attributes" and "capabilities"). To obtain the intercorrelations among the seven factor variables (Table 7), the computer had to be programmed to use the beta weights to calculate factor

scores for each of the 213 HMF subjects. Given space, an array of seven values for each of the "factors in persons" could have been displayed as profiles for each of the subjects. Since they were orthogonal, the dimensional scores were used to compute the regressions of eight ninth-grade criterion measures upon seven preadolescent factor variables.

(2) Hierarchical model. - A hierarchy involves the arrangement of elements into a graded series, orders, or ranks such that each element is subordinate to the one above and coordinate with those at the same level. Sir Cyril Burt (1940, 1949), who began his studies two decades earlier, was the first to advance a hierarchical group-factor theory of the structure of human abilities. In his 1950 book, Vernon employed Burt's four-level model (Figure 2, p. 22) for his hierarchical approximation of mental structure which had a general intellectual factor (g) superordinate to two major group factors, the verbal-educational (v:ed) and spatial-practical-mechanical (k:m) groups. In a recent Bingham Lecture on "Ability Factors and Environmental Influences," however, Vernon (1965) concludes "there is no one final structure, since so much depends on the population tested, its heterogeneity and educational background, the particular tests chosen, and the techniques of factorization and rotation employed." Nevertheless, the English educational psychologist retains the general intellectual factor as well as his v:ed and k:m group factors in his diagram of "the main general and group factors underlying tests relevant to educational and vocational achievements." On the other hand, Guilford (1961) goes back to his book on Personality (1959a) for a hierarchical model "treeing" down from two syndrome types (e.g., strength of character and general self-restraint) linked by one of the primary traits (e.g., honesty), each of which has subordinate traits at the "hexis" level (e.g., impulse control). Each of these habit-pattern traits (third level) is grounded in fourth-

level specific-action traits (e.g., resistance to cheating observed in a series of opportunities).

(3) The matrix type of model. - To represent the third model which "comes about from attempts to discern logical relationships among the known factors," Guilford (1961, Fig. 3) elects to illustrate the matrix with his "cubical model of the structure of intellect, representing categories of primary abilities with respect to three modes of variation (1959b). The three-dimensional matrix has five intellectual operations crosscutting four kinds of content, yielding six types of products (i.e., 120 cells or "primary mental abilities instead of the 55 presently recognized" to use Guilford's own words in his 1961 article on "Factorial Angles to Psychology"). Humphreys (1962), in a thoughtful paper upon "The Organization of Human Abilities," grants that test behavior can almost endlessly be made more specific but does not believe that the 120 test behaviors suggested by Guilford's structure-of-the-intellect model should be regarded as definitions of "primary" factors. Instead, Humphreys moves on to Guttman's facet theory (1958) which he seems to regard as a matrix-type model for the definition of a universe of possible tests.

Facet design and test construction. - Neither Coan (1964) nor Ferguson (1965), however, agree that the facet model,[11] which Humphreys illustrates by a three-dimensional Guilford-type block, is a more general substitute for the hierarchical model. As Ferguson (1965, p. 48) points out, a matrix model is merely a descriptive statement of the organization of human abilities at a particular point in time and does not deal with the developing and changing structure of abilities (or talents?) in the child and or adolescent. On the other hand, Humphreys' suggestion that facet theory would facilitate controlled heterogeneity in test construction appears to have merit. For example, a sixty-item reasoning test would be defined by the item-content facet (use of numbers, words, figures, and photographs), the item-format facet (use of analogies, series, and classification), and the categories-of-reasoning facet (numerical, mechanical, abstract, inferential, and intuitive). Humphreys (1962) asserts that, from the point of view of facet theory, there are no "pure" tests and controlled heterogeneity should be the goal of test construction. The most recent presentation of Guttman's facet theory (1954) may be found in Foa's account (1965) of facet design and analysis wherein interpersonal behavior is defined as the Cartesian product of the observer by perceptual and behavioral facets. Foa also suggests experiments employed by Bruner, Goodnow, & Austin (1956) in their studies of the thought processes could be conceptualized in terms of facet theory (e.g., p. 42).

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[11] A facet is a logical dimension and its elements are the presence or absence of logically defined parts of that dimension. In an earlier HTRP report (McGuire, 1961a, p. 66), Figure 1 is an example of a three-facet model with sex role, behavioral, and contextual dimensions. Another example is the schematic diagram of a community in the next chapter (Fig. 3.1, p. 3-3). The three facets are the cultural, structural, and status dimensions represented. Possible change is represented by horizontal and vertical arrows as well as broken lines. Looking at each facet or dimension, only the presence or absence of each element or category is important since there are no measures.

Some forms of the hierarchical model for human behavior. - Modern behavioristic conceptions of a symbolic or internal mediating mechanism to represent the past in the present tend to be parallel to Hull's principle of the habit family hierarchy (1952, pp. 256-274) or motor equivalence governing behavior in space. Mechanisms invoked to explain sequences of symbolic responses or trains of thought also borrow his notion of divergent and convergent mechanisms as well as the concept of a fractional anticipatory goal response (Maltzman, 1965; Staats, 1961). Most of the theorists, however, are quite aware that Hull's "hierarchy" reflected observed external spatial behavior of animals rather than internal thought processes of human subjects. Hull's initial formulation (1934) reflected an ordering of alternative (interchangeable) responses according to their strengths. Hull's hierarchies, though based on observed spatial behavior, can be applied by logical analogy to cognitive behavior. By analogy, cognitive behavior conceptualized in a hierarchical structure would be an ordering of learned alternative intellectual behaviors.

The most familiar hierarchical models place capabilities (factors, operations) in a subordinate-coordinate-superordinate order proceeding from the more specific to the more general. In his 1965 Bingham Lecture, wherein he pinpoints environmental influences which underlie the development of different patterns of human abilities, Vernon employs a hierarchical model. He uses the model to simplify the problem of designing cross-cultural studies in the emergent, nontechnological nations of the world with a view toward cultivating the potential talents of their young people. The illustrative hierarchical model chosen by Guilford (1961) looks somewhat like a genealogical tree with four levels upward from specific actions to two personality syndromes (strength of character and general self-restraint). The syndromes have in common a number of acts of resistance and habit patterns as well as a primary trait (honesty). In a recent proposal for an abilities conception of personality, Wallace (1966) questions some of the assumptions underlying essence conceptions of personality which typically involve hierarchical arrangements of response predispositions (e.g., needs or traits) from a sample of responses; e.g., to ambiguous projective materials. He would reduce stimulus ambiguity to determine whether or not given individuals "are simply capable or incapable of certain responses in certain stimulus situations" (p. 133). When the proposal is put to a test, however, there is a likelihood that the repertoire of observed response capabilities may turn out to be arranged hierarchically in a superordinate, coordinate, and subordinate manner with their occurence dependent not only upon specific stimulus situations but also upon symbolic transformations of perceived cues.

The acquisition of knowledge. - As stated earlier (Infra., p. 2-20), Gagne (1962) has proposed employing a hierarchy of subordinate and coordinate capabilities, to be learned when necessary, in order to master a superordinate set of capabilities required to perform a given task, acquire a terminal concept, or (by extension of the principles) to develop a compatible pattern of talented behavior. The proposal, which is illustrated in Figure 2.01, is based upon the notion of transfer from previously acquired, relevant learning sets (Harlow, 1949). The illustration diagrams a hierarchy of knowledge to be acquired for a "final task" of deriving certain mathematical formulae. The model specified the patterns of learning sets (subordinate capabilities) to be tested among ninth-grade boys who could not accomplish the final task. When the pattern of capabilities was identified, the model identified the learning program to be undertaken by each boy for mastery of the number series task. Gagne's book, The Conditions of Learning (1965), employs versions of the hierarchical model to represent concept learning (p. 131), the learning of principles (pp. 150 and 155), and learning structure for number operations (p. 181).

Plans and the structure of behavior. - On the other hand, Miller, Galanter, & Pribram (1960, p. 15) grant the evidence for the principle that behavior is organized simultaneously at several levels of complexity and speak of this fact as "the hierarchical organization of behavior." Nevertheless, they deny that their notion has any relation to Hull's use of the phrase "habit-family hierarchy" and assert they are talking about "a hierarchy of levels of representation." To guide behavior, a human being builds up internal representations which the authors term Plans (any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed) made possible by the Image (the accumulated, or-

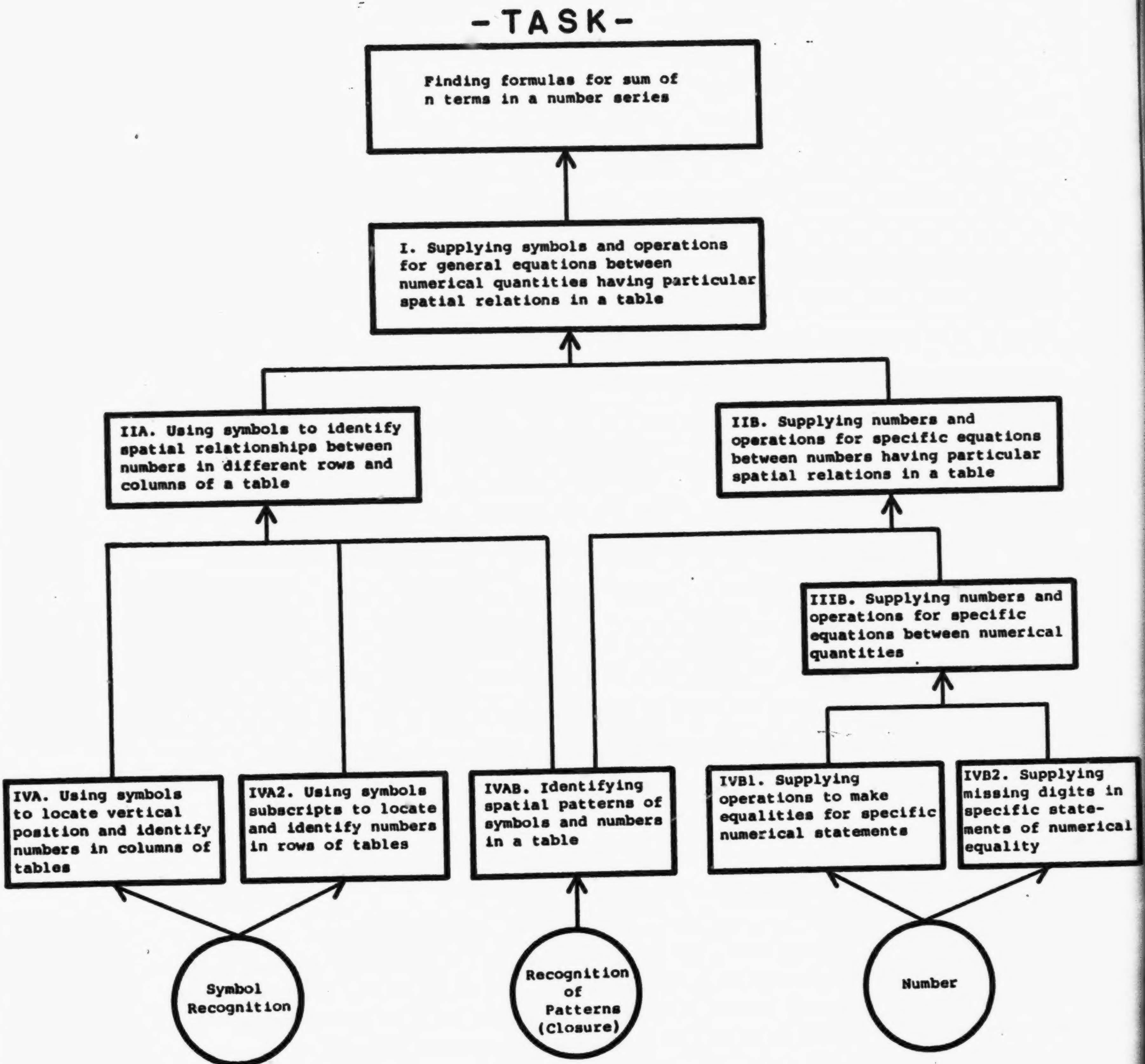
-TASK-
Finding formulas for sum of n terms in a number series
I. Supplying symbols and operations for general equations between numerical quantities having particular spatial relations in a table
IIA. Using symbols to identify spatial relationships between numbers in different rows and columns of a table
IIB. Supplying numbers and operations for specific equations between numbers having particular spatial relations in a table
IIIB. Supplying numbers and operations for specific equations between numerical quantities
IVA. Using symbols to locate vertical position and identify numbers in columns of tables
IVA2. Using symbols subscripts to locate and identify numbers in rows of tables
IVAB. Identifying spatial patterns of symbols and numbers in a table
IVB1. Supplying operations to make equalities for specific numerical statements
IVB2. Supplying missing digits in specific statements of numerical equality
Symbol Recognition
Recognition of Patterns (Closure)
Number

Fig. 2.01. Gagne's hierarchy of knowledge developed from subordinate capabilities or "learning sets" (provided by R. M. Gagne with permission from the American Psychological Association).

ganized knowledge an organism has about itself and its world). The hierarchy of TOTE (Test-operate-test-exit) units which makes possible the execution of a Plan may be cast as an outline of operations or take the form of a list structure in a program for a digital computer. Examples range all the way from the Logic Theorist (or LT program) employed by Newell, Simon & Shaw (1958) to test ideas about human problem-solving behavior couched in terms of information processes, to the "mind-computer metaphor" recently reported by Colby (1967) in a paper upon computer simulation of change in personal belief systems.

Images and plans ("You imagine what your day is going to be and you make plans to cope with it") are mediating organizations of experience operating on all levels simultaneously to explicate the manner in which behavior is controlled by an organism's internal representation of its universe (Miller, Galanter, & Fribram, 1960, pp. 6-15). The three self-styled "subjective behaviorists" (p. 211) suggest that linguistic analysis provides a model for the description of all kinds of behavior (p. 14). Consequently, they agreed upon assumptions (p. 18) which permitted them to explore relations between the Image and the Plan--the inferred multi-level molar units of their theory about behavior. Implicit in their approach there is a new psychological principle--with guidance from the Image, higher-level Plans can be used to construct Plans to guide behavior (or to change the Image).[12] For example, the "grammar plan" with its hierarchy of grammatical rule of formation and transformation operates to construct a motor plan tested for its "sentencehood" in speaking (pp. 139-158).

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[12] Hebb (1960), in his appraisal of the behaviorist revolution in American psychology, employs the terms Metaplan (what Plans may be in effect at any one time?) and Plan (determining the moment-to-moment course of behavior) in his argument that an analytical study of thought processes no longer can be postponed.

The Harvard-Penn-Stanford trio of psychologists believe that their multi-level, hierarchical Image-Plan conception of an internal representation escapes the kinds of criticism that have been leveled at constructs such as Tolman's "cognitive maps" (1948), which took the form of inferred intervening variables anchored by independent and observable variables (1951, pp. 279-364). In his APA presidential address, Hebb (1960) not only notes that the computer analogy (Plans) has the capability of including an autonomous central process as a factor in behavior but also remarks that the representational "mediation hypothesis" (Osgood, 1953, pp. 392-412) is quite compatable with Hullian theory. Not only does Hebb link the mediating process with Woodworth's "schema-with-correction" in figure learning (1938, p. 74), both being dependent upon contextual sensory cues, but also he views the self as a complex mental process which the "tough-minded experimentalist in the problems of thought" should study analytically.

Central Representations in Relation to Observed Behavior

By and large, the use of constructs such as plans and metaplans, images, cognitive maps, mediation processes, and schema permits the discussion of behavior in molar terms without specifying the precise biological substrates of the processes postulated to underlie behavior observed in response to independent stimulus situations. For example, in his Organization of Behavior (1949), Hebb recognized that phenomena labelled set, attention, attitude, expectancy, hypothesis, intention, vector, need, perseveration, and the like have one common element, and one only. The influence is not an immediately preceding sensory stimulation for each response but an ongoing central activity which Hebb labels the autonomous central process (p. 5). Hebb concluded, "The problem for psychology then is to find conceptions for dealing with such complexities of central neuron action: conceptions that will be valid physiologically and at the same time 'molar' enough to be useful in the analysis of behavior" (p. 11). His theory of brain function, wherein the thought process involves a phase sequence made up of a series of cell assemblies ordered in time, was published during the same year (1949) as Harlow's report of investigations into "learning to learn." Harlow's "learning sets" were regarded as analogues of strategies for information processing acquired by rhesus monkeys from experiences with a given kind of problem. Four years later, after work with human subjects in addition to his primates, Harlow (1953) pointed out limitations of a drive-reduction theory of motivation and asked, "...can anyone seriously believe that the insatiable curiosity-investigatory motivation of the child is a second-order or derived drive conditioned upon hunger or sex or any other internal drive?"

During the next year, Hebb addressed experimental psychologists upon the notion of drive and the conceptual nervous system (C.N.S.). He adopted Bergmann's view (1953) that "intervening variables" and "hypothetical constructs" are functionally similar. Consequently both intervening variables and theoretical constructs[13] can properly appear in the same theory. Hebb's published paper (1955) referred to a range of studies to illustrate the "cue" and "arousal" functions of the nonspecific projection system[14] in alertness, emotionality, and curiosity.

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[13] Theoretical constructs are intervening variables which either are physiologically interpreted or located inside the organism.

[14] Ascending and descending projective fibers link the cerebral cortex with the RAS or reticular activation system (related to sleep, arousal, and attention) which provided a referent for Lindsley's "activation theory of emotion" (in Stevens, 1951, pp. 473-516). They also are linked with the limbic system that borders the hypothalamus and which is strategically located for "the correlation of feelings, particularly those arising from internal organs of the body" (the Papez-MacLean Theory of emotion, Morgan, 1965, pp. 311-312). Thus the RAS and limbic systems, both associated with the hypothalamus, mediate emotional experience and expression.

Linking psychological with physiological terms, he urged research upon the "immediate drive value of cognitive processes" which, without intermediary, provide cortical feedback to the arousal system. As indicated in the previous section, Hebb (1960) contended that the first stage of a revolution in psychological thought (explaining simpler behavior through an experimental application of the S-R paradigm) had been completed; and, now, the time had come for an attack upon more complex behavior, particularly the thought processes, while maintaining liaison (translatability of terms) among different universes of discourse.

In another APA Presidential Address, Sears (1951) laid a foundation for the theory and symbol systems empolyed in this research.[15] Sears viewed a theory as "a set of variables and the propositions that relate them to one another as antecedents and consequences," wherein intervening variables ultimately have to be reducible to operations. He recognized the two advantages of theory development which motivate the present chapter. First, relationships observed in research have greater generality if the variables involved are part of a larger theory. Second, a worthwhile theory permits the use of multiple variables together with their relating principles, in various combinations for the prediction of events as well as the study of changes over time.[16] Moreover, Sears' current view (in

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[15] Figure 2.02, a schematic diagram of relations among variables involved in a dyadic and/or polyadic interaction context model, employs Sears' terminology and symbols in representing a theory of human development and intelligent behavior.

[16] Principles of theory building, the reduction of intervening variables to operations, and the testing of hypotheses are illustrated in Chapter IV, particularly pp. 4-1 to 4-16. Explicit statements of hypotheses in testable form (regression models) are in a statistical appendix to the main body of that chapter (pp. 4-42 to 4-73).

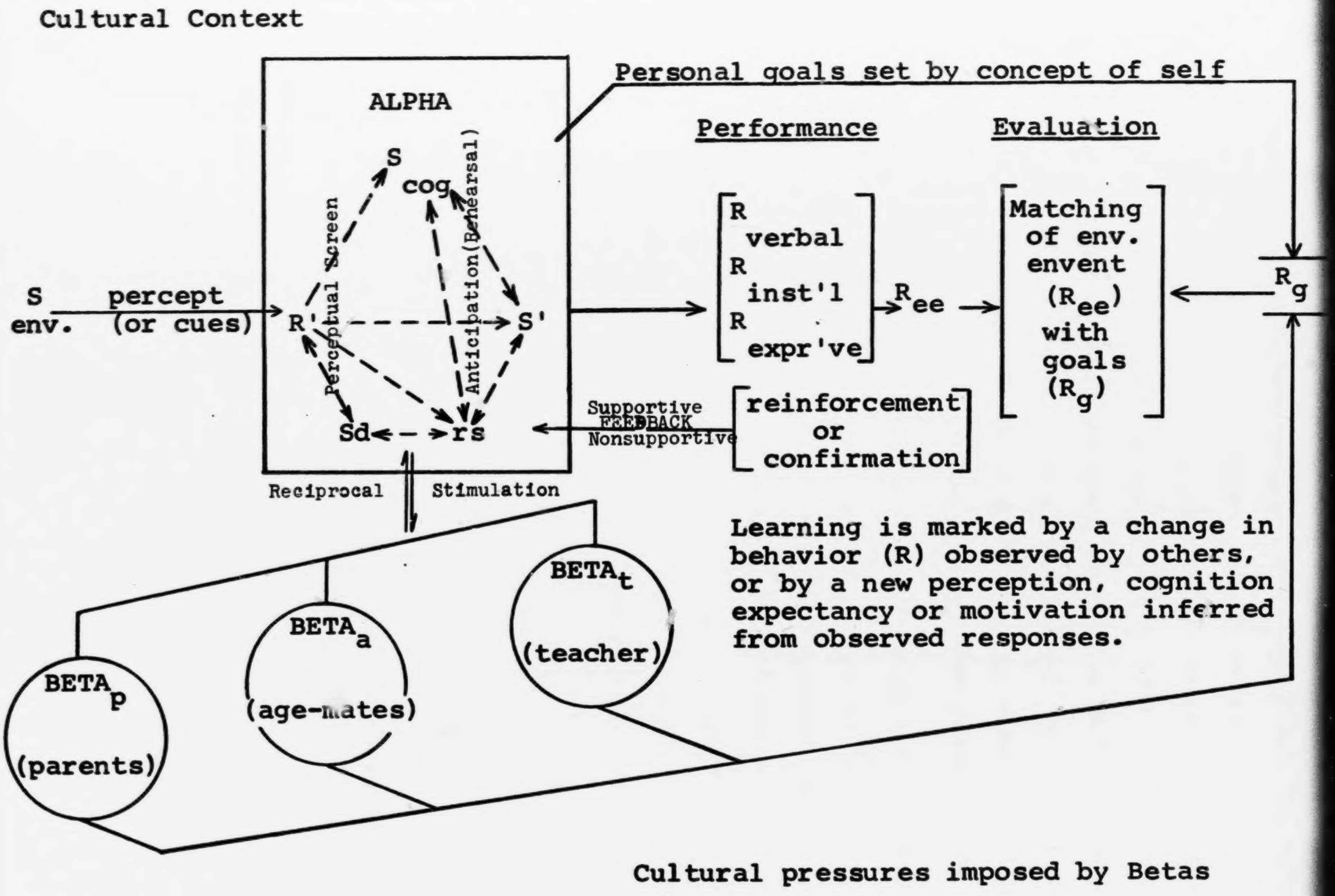
Cultural Context
ALPHA
Personal goals set by concept of self
Performance
Evaluation
S
cog
Perceptual Screen
Anticipation(Rehearsal)
S env.
percept (or cues)
R'
S'
Sd
rs
R verbal
R inst'l
R expr've
R ee
Matching of env. envent (R ee) with goals (R g)
R g
Supportive
FEEDBACK
Nonsupportive
reinforcement or confirmation
Reciprocal
Stimulation
Learning is marked by a change in behavior (R) observed by others, or by a new perception, cognition expectancy or motivation inferred from observed responses.
BETA t (teacher)
BETA a (age-mates)
BETA p (parents)
Cultural pressures imposed by Betas

Fig. 2.02 Dyadic interaction model for the study of human development and intelligent behavior

Stevenson, 1966, pp. 36-39) "personality" and "social psychology" are but one field of study was implicit in the 1951 statement. Pointing out that psychologists tend to think and theorize monadically, "they choose the behavior of one person as their subject matter," he made a strong case for a *dyadic* unit of behavior, "one that describes the combined actions of two or more persons," as the locus of theory and research in human behavior. In general, motives, habits, cognitive capacities, ego organization, and even "on-going action" are shaped by an individual's (Alpha's) *expectancies* of either supportive or nonsupportive behavior on the part of others (Betas) In Sears' schematic representations, Alpha's potentialities for action are specified by S_d (motivation) and S_{cog} (cognitive structures) which in large part are a product of learning (that is, "*changes* in potentialities for action"). By the middle of the twentieth century, then, Hebb and Tolman had introduced the notion of central processes governing behavior; Harlow not only had established the concept of "learning how to learn" but also pointed out limitations of a drive-reduction theory of motivation; and Sears had shown us that all human behavior is inherently social. Furthermore, in complementary theory and supporting research, other behavioral scientists (Warner & Associates, 1949; Erikson, 1950; Havighurst & Taba, 1949; Hollingshead, 1949; Kluckhohn & Murray, 1948; Lerner & Lasswell, 1951; Parsons & Shils, 1951) had established meaningful linkages among cultural contexts, social structures, personality, intellectual functioning, and observed behavior, together with "markers" of prior experiences in family backgrounds (Warner, Meeker, & Eels, 1949) and in age-mate societies (Clark & McGuire, 1952; McGuire & Clark, 1952). In retrospect, one would infer that the midcentury nexus of developments in psychological, anthropological, and sociological theory and research, together with the contributions of Bartlett in England and Piaget in Paris and Geneva, had a good deal to do with the launching of a new *zeitgeist* in the behavioral sciences and the current renaissance in education.

A Dyadic Interaction Model for Educational Psychology

So far the focus of the chapter has been upon the multidimensional nature of human abilities, beginning with an adaptation of Ferguson's theory (pp. 2-15 to 2-21), followed by a conception of "human talents as sets of behavioral capabilities" (pp. 2-21 to 2-31), and concluding with a concise statement of converging evidence for the postulation of central processes guiding intelligent, talented, and creative behavior under the rubric "Central Representations in Relation to Observed Behavior" (pp. 2-31 to 2-35). Crucial to this chapter is the introduction of Figure 2.02, "Dyadic (and Polyadic) Interaction (or Transactional) Model for the Study of Human Development and Intelligent Behavior" (p. 2-34). The model acquires explanatory and predictive value when one closely examines variable elements of the educational encounter and requires an explicit statement of implicit assumptions (or the hidden agenda) of those professing to study it, the media and interfaces, as well as the human beings involved. The dyadic interaction model turns out to be a valid representation of the central concerns of contemporary educational psychology. In other words, educational psychology is a dyadic behavioral science--not applied psychology (Ausubel), a none-too-subtle transformation of military training research under the guise of instructional design and systems development (Glaser), or an applied experimental psychology (Gagne). All three maintain the monadic tradition of American academic psychology stemming from William James (who gave very limited attention to language, an essential for developing reciprocal stimulation in becoming and being human) and E. L. Thorndike (whose connectionism minimized the "higher mental processes" by reducing them to quantitative aggregations of simpler processes.[17] Each of the three approaches can contribute to desirable educational encounters only in so far as they facilitate the acquisition of learned capabilities or, to employ a more accurate designation, acquired reflexive forms of behavior (to be examined in a later section). But training is not enough since the problems of living seldom are presented to the individual in systematic order. Therefore educational experiences designed to cultivate (or develop) central processes capable of selecting among, combining, and re-combining learned capabilities or reflexive behaviors when novel conditions, symbols, or events are encountered become necessary.

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[17] References not among the entries at the end of the chapter have had a significant influence on our theory building. Most important were the self reports in volumes of A History of Psychology in Autobiography by Baldwin, McDougall,

Perhaps relevant excerpts from an unpublished paper prepared during the first HTRP year may reveal the development of a theoretical orientation (which has been designated at different times by several persons as being "behavioral functionalism," "behavioristic functionalism," and "cognitive functionalism," as well as

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Spearman, and Stern (Vol. I, 1930); Judd and Woodworth (II, 1932); Bartlett, Thorndike, and Watson (III, 1936); Boring, Hull, Piaget, Thurstone, and Tolman (IV, 1952); and Allport, Dallenbach, Guilford, Helson, Murphy, Murray, Rogers, and Skinner (V, 1966). The chapters upon "Language and Relational Thinking," "Learning as Organization of Experience," and "Applications of the Psychology of the Higher Mental Processes" in C. H. Judd's Education as Cultivation of the Higher Mental Processes (Macmillan, 1936) had an impact rivalled only by H. A. Murray's concept of "regret processes" and the rich content of his Explorations in Personality (Oxford, 1938). Lee Cronbach has a provocative and informative account of "Issues Current in Educational Psychology" in an S.R.C.D. Monograph (1965, 30, 1, Serial No. 99) devoted to "Mathematical Learning" which was edited by L. N. Morrisett and John Vinsonhaler. The 63rd N.S.S.E. Yearbook on Theories of Learning and Instruction edited by E. L. Hilgard (Chicago, 1964) has chapters which illustrate the current dilemma. Fred Macdonald's initial chapter on "The Influence of Learning Theories on Education (1900-1950)" contrasts Chicago functionalism (Dewey, Judd) wherein "mediated experiences" were "the central psychological events" with Thorndike's "connectionism." Glaser has a chapter on "The Implications of Training Research for Education" (pp. 153-181). Without reference to a dyadic model, Gage's monadic approach to "Theories of Teaching" (pp. 168-215) prevents him seeing that teaching (the introduction of controlled discontinuity into a learner's ongoing experiences) and learning (the organization of experience) are opposite sides of the same coin. Nevertheless, he does reveal a readiness for "central process" ideas in his concept of "cognitive restructuring."

dyadic central process theory"). After the orienting excerpts, some concepts are clarified, and a research model is derived to exploit the dyadic interaction approach. Then the mathematical and operational counterparts are examined only briefly since they are fully illustrated in Chapter IV.

Toward the Study of Human Learning (McGuire, 1958)[18]

Five years ago I would have fought back with considerably more fire and vigor than I shall today at some of the points of view advanced in this symposium. Frankly, I represent a somewhat different tradition than the men who have been talking to you. In fact, one of the psychologists here has asked me if I were a sociologist. Such is not the case. My background in psychology, beginning in Canada, has been thoroughly biological, paying a good deal of attention to human physiology and developmental genetics as well as experimental psychology, with a high regard for comparative approaches. True, I did complete a graduate course in Educational Psychology with the late David Russell and Dean Fred T. Tyler (University of Victoria) whom I knew as good friends at U. B. C. before they moved to California (Berkeley) after World War II. The textbook, which they used as a background, was Peter Sandford's Thorndike-oriented Foundations of Educational Psychology: Nature's Gifts to Man (Longman, Green, 1938). From that beginning, I have gone on a quest to understand the human being, to construct meaningful pattern models of his processes of development and the ways in which he learns and relearns in relation to significant persons in his life. This concern extends to personality, the "who I am, " "what I want," and "where I am going" that results from an organism developing, learning, perceiving, and valuing in a world of other human beings. My quest and my models have brought me, I believe, somewhat closer to reality and, perhaps, my work somewhat farther from acceptance than if I had followed the well-beaten paths. As a consequence, I have some biases which are going to appear in my part of the symposium.

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[18] Original paper, with some minor revisions to maintain relevance, prepared for a Symposium, "Can the Laws of Learning Be Applied in the Classroom?", Northwestern University, May 17, 1958. The symposium was made possible by a grant from the Carnegie Fund to the Department of Psychology and the School of Education at Northwestern University. The other participants in order of appearance, were Benton J. Underwood (Northwestern), Kenneth W. Spence (Iowa), Arthur W. Melton (Michigan), Ernest R. Hilgard (Stanford), and Robert L. Thorndike (Columbia). The papers by Spence, Melton, and Underwood were published in a Spring issue of the Harvard Educational Review, 1959, 29, 83-106.

The charge given to me is to be highly critical and, where possible, constructively so. My initial response to what I have heard is that learning theorists or, as Professor Spence would term them, behavior theorists, are tied too closely to a classical view of a "pure" science. Too much has been made today of the models of the physical sciences, not the actual present-day models, but older ones. The classical physicists, to take an oft-mentioned example, have all but disappeared. Physics no longer is an exact science; rather, it is a science of probability. Physicists are finding new particles and these particles interact with others they are studying. Each particle is a new variable which they have to add to the set already identified in order to explain what they are looking at and to make sensible predictions. Too much of our psychology, including what we have heard about learning theory and the behavior of organisms today, is predicated upon a search for universal laws and for one-to-one relationships which probably do not exist.

Frankly, I believe that we, as behavioral scientists, cannot afford to be anything but more venturesome in our attempts to understand, represent, forecast, and evaluate learning as it occurs in the classroom. So far, all that you have heard has to do with the acquisition of predetermined behavior patterns. The foci are habits, avoidances, some things to be repressed or inhibited, and substitute bits of behavior. By and large, they are represented as being acquired by the learner through what has been termed frequency and practice. Too much of what we have heard today has to do with habitual behavior, that which can be determined and which can be managed without taking the learner, the teacher, and other complex elements of the learning situation into account. In other words, too much emphasis has been upon the acquisition of limited behavioral capabilities and not enough has had to do with the establishment of what Professor Hilgard called "learning steps." Most certainly not enough has been said about the acquisition of values and resultant attitudes, of the ability to make distinctions and selections--not just discriminations, and of what might be called choice behavior.

So far, I have not heard mention of the fact that a boy or a girl comes into the classroom with a set of prior experiences and that, in one way or another, this "readiness" (or the lack of it) can be characterized. Parenthetically, white rats come into mazes or various other apparati with prior experiences. In the case of the animal or the human learner, these experiences by and large are categorizable or measurable. For example, the simplest and most visible differences of male and female represent probable variations in the prior learning experiences of boys and girls. Familial and other "markers" also can be employed to denote the antecedents of what may well turn out to be psychologically important intervening variables in the study of human learning. A realistic approach, even to the study of habitual behavior, should make provision for finding possible variations in potentialities, in the learning process, and in performance which can be identified by comparisons among sample populations.

The second vital element which I have not heard mentioned today is that other human beings, cultural agents such as parents, teachers, and peers of the learner, have an impact. They play a prominent part in the behavior of a learning organism who is becoming a person. Parenthetically, human beings certainly do much to determine the behavior of the white rat, except that the experimenter seldom realizes that he is part of the situation and that he actually has been setting up expectations. In the classroom, and in the laboratory, the reality is that learning involves at least dyadic relations between the learner and some agent who can reward or punish, approve or disapprove the behavior, accept or reject the learner.

So far as I know, only Sears (1951) has ventured to make this necessary distinction between monadic and dyadic accounts of learning which is most important in studying the human being and his experiences in the classroom. An organism becomes human when he or she learns that the word, or a series of them, can control the actions of others as well as one's own behavior.

Now, to be constructive and somewhat venturesome, let me direct your attention to figure 1 (an earlier version of Figure 2.02, page 2-34). My attempt at a paradigm here has been influenced by Hull, Spence, Sears, Tolman, and others in addition to my own work (and that of my associates and students). The model has been restated by Goethals (1958). Classroom learning as well as ongoing behavior takes place in a variable setting, or cultural context which differs to some extent within schools and certainly among communities. The setting involves not only a learner (Alpha) among other learners, but also at least one teacher or cultural agent ($Beta_t$) and other learners ($Beta_a$) who are age-mates to Alpha and pupils to the teacher ($Beta_t$), each of whom has central processes like those depicted within Alpha, experiences reciprocal stimulation, and has behavior evaluated ($R_{ee} \| R_g$), and encounters feedback.

In addition there are "shadow others," largely parents ($Beta_p$) not present in the situation, who influence classroom learning. Each participant, including Alpha, brings into the behavior setting the ability to perceive stimuli, $\Sigma S_{env} \longleftrightarrow R'$ and $S_d \longleftrightarrow R'$, where S_d is a psychological counterpart of subcortical arousal systems observed as impulsivity, excitability, emotionality, and a curiosity-investigatory-manipulatory drive (Hebb, 1955; Harlow, 1953) stimulating yet being controlled by other elements (process variables) inferred to be operating in the central processes of Alphas and Betas in reciprocal interaction with one another. When an external stimulus or self-stimulation from any element of the central processes initiates a predictable habitual (handshake), avoidant (woman turning her face when a man moves to kiss her), or substitute ("darn" for "damn") responses, the actions may be termed reflexive behavior instead of forms of intelligent or talented behavior where central processes combine and re-combine learned capabilities according to the conditions and flow of events in the behavioral (cultural) context. Each participant (Alpha and Betas) brings into the behavior setting the residuals of prior experiences either in the form of cognitive schemata (S_{cog}) or in the form of expectancies (rs_p, rs_a, rs_t) about the supportive or nonsupportive responses of Betas (parents, age-mates, teachers or other more remote adult authority figures representing community institutions--see Figure 3.1 in Chapter III, p. 3-5). Each Alpha characteristically anticipates, revises schema-with-correction (Woodworth, 1938, p. 74) in terms of sensory feedback, and responds to gratification or deprivation (the experienced facet of reward or punishment), acceptance and avoidance by age-mates (Betas) and close-tied parental figures ($Beta_p$), as well as approval and disapproval on the part of cultural agents (such as $Beta_t$) or one's own Self. The self-evaluation begins to replace Beta-evaluation when Alpha acquires a sense of identity ("Who am I?") and begins working toward a sense of integrity ("Am I capable of evaluating my own behavior?") and away from early dependency motivation (McGuire & Fruchter, Q representation initiated in 1957 and published in 1967).

Briefly, teaching occurs when a cultural agent introduces some form of discontinuity into the ongoing experiences of Alpha by showing, telling, or setting up conditions for discovery learning (first encountered by the speaker in a discussion of T. R. McConnell's doctoral dissertation of 1934 in Judd, 1936, pp. 60-64). The complementary process, learning, occurs when a new form of reflexive behavior (habit, avoidance, substitution, inhibition, skill or learned capability) is acquired, or when one can infer or observe that schemes (S_{cog}, rs, R_g) have been restructured (S'_{cog}, rs', R'_g), or when Alpha demonstrates transfer (pp. 2-16 to 2-17) or transformation (Berlyne, 1965; Piaget, 1966) of concepts and principles acquired in one behavioral system to another. The ultimate test of learning is not "selective regurgitation" of what has been memorized to a sample of cues but a demonstrated capability of transferring, translating, or transforming what has been mastered in one set of circumstances to solve problems or to cope effectively with novel situations. Thus evaluation is an essential part of the dyadic interaction model for Educational Psychology as a behavioral science.

Goals (R_g), the "match" with which the gestalten of verbal (spoken or written), instrumental, and expressive responses combined into a performance (R_{ee}) and evaluated by Betas or by Alpha, may be set by one's self (Alpha) or by significant others (Betas) who may or may not be models for learning through imitative identification--seeing one's self in another and matching or taking over behavior patterns. When expectancies are confirmed in the matching of performance with goals, one may speak of confirmation or reinforcement; when contradicted or thwarted, forms of inhibition and extinction or mechanisms of defense ("When thwarted or at bay, deny, detour, or delay") often may be observed. In other words, cognitive development, personality dynamics, social learning, and social behavior are merely facets of a single set of phenomena.

As Professor Hilgard has warned us today, you cannot go into the classroom situation and set up clearly-defined classical experiments. The natural experiment requires the active, informed participation of human beings in the situation, especially the school person who ultimately decides what is to be done. To this end we have invited the supervisors, the principals, and certain teachers and counselors from the four Texas communities to a work conference at the University in June. There we intend to work with them on the ideas behind the Human Talent Research Program, the information we already have about boys and girls to be in the eigth grade next year, and the possible kinds of natural experiments which school people might elect to undertake. From our experience so far, we already know that most of the variables outlined in the model can be anchored to operations in one way or another. What we can do, however, is limited by what these people are willing to undertake as well as have us categorize, measure, and evaluate in other ways.

In brief compass, then, I have attempted not only to criticize but also to illustrate some of the possibilities of a modern dyadic interaction theory of development and behavior with reference to the kinds of learning that go on in schools. Frankly, I believe that we can no longer afford to hold up as our ideal the classical skeletonized laboratory experiment with the manipulation of a limited number of variables and the search for universal laws of learning. One advance lies in the design of natural experiments where relevant elements of the context may be taken into account. Working from models, changed with advancing knowledge, new variables can be introduced not only by means of direct operations and measures but also by selecting sample populations and by employing multivariable and often indirect evaluations made possible by the use of high speed computers. To this end, we have to grant that human learning has to do with something more than basic habit formation and allied reflexive forms of behavior. Naturalistic research may possess inherent values. The very inquiries and the ideas generated from them can be used to approach complex human learning situations, the Alphas and Betas involved, and interplay of factors which enter into the processes of acquiring skills and knowledge, now orientations, and behavior patterns. Here I end my responsibility "to do a little bit of needling" and "to say something provocative which might lead to new patterns of theory and research.

Interim revision and documentation.- During the period in which the Principal Investigator (McGuire) was recovering and rehabilitating himself from a massive CVA in November, 1962, much rethinking of theory, reference work to catch up with and incorporate the current literature into ongoing projects went on. McGuire (1965) prepared a memorandum for the NEA Project on academically talented youth, revised a 1962 manuscript for 1967 publication in a book upon creative behavior, and drew together a statement on "Research and Development in Teacher Education at The University of Texas" for publication in Psychology in the Schools (1964).

That publication led to a request for interpretive articles to be used in teacher education and to be a set of reference and orientation material to guide persons planning to undertake research involving central process and intelligent behavior. Thomas Rowland had worked as an academic assistant and later as a teaching fellow with McGuire in revising Behavioral Science Foundations of Education: A Handbook for Learning Through Guided Discovery (now being reworked for publication by Holt, Rinehart & Winston). The collaboration turned out to be mutually profitable and enriched the HTRP reports as well as Behavioral Science Research Memoranda prepared on behalf of the Research and Development Center for Teacher Education (available through ERIC). Rowland and McGuire prepared articles published by Psychology in the Schools on "The Development of Intelligent Behavior" with foci upon Jean Piaget (1968a), Daniel E. Berlyne (1968b), Robert W. White (1968c), and Jerome S. Bruner (1968d). These articles were drawn together with four more to be published in 1969 to form Emergent Views of Intelligent Behavior (1968e) upon the initiative of Prentice-Hall who made pre-publication copies available for distribution after making special arrangements with the Editor of Psychology in the Schools. All of this activity provided a background for an examination of theory and research converging upon the theme of a From Interaction to Intelligent Behavior, which incorporates the dyadic interaction model set forth above and was put in pre-publication form (1968f) with assistance from Holt, Rinehart & Winston. Moreover, McGuire and Rowland prepared an article upon Jean Piaget for Macmillan's forthcoming Encyclopedia of Education. These experiences have led to clarifications of our theoretical orientation and its application to the educational encounter and research illustrated in what follows.

Intelligent Behavior Contrasted with Reflexive Behavior

The word intelligence is derived from the Latin words intus legere, which mean "to read what is within" and imply some internal or central process. Behavior governed by such a central process or operation would then be understood as "intelligent."[19] In contrast to intelligent behavior is sense-dominated (Hebb, 1966, p. 83), cue-dependent (Miller & Dollard, 1941, pp. 21-28), or stimulus-bound behavior which, with certain reservations,[20] might well be designated as reflexive

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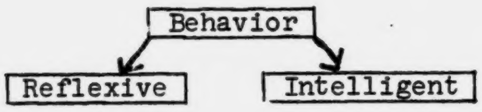
[19] Piaget (1966, pp. 3-17) has discussed the adualistic (biological and psychological facets) and adaptive nature of intelligent behavior and, in a significant article (1961), he considers three interacting processes or factors which underlie formation of a system of dynamic transformations which permit operations which make us understand the state of things; namely (a) maturation (the invariant sequence of changes, order[illegible] but not age-graded), (b) physical and logicomathematical experiences (involving learning through the organization of experience as well as equilibration--assimilation or the incorporation of objects into patterns of behavior and concurrent accomodation of schemata), and (c) social interaction (reciprocal stimulation in dyadic and polyadic transactional systems which foster attainment and maintenance of a dynamic equilibrium through a train of exposures to conditions and events--that is, adaptation).

[20] Berlyne (1965, p. 11) observes that the English word "reflex" (from the Latin reflexus, employed in the sense of an acquired habitual and predictable way of thinking or behaving) now is virtually never used by Western psychologists "except to denote the rigid, unlearned behavior patterns that make up a relatively small part of higher mammalian behavior." Russian psychologists use "reflex" to designate a stimulus-response association which is highly susceptible to modification by central processes. Much of the current research, particularly that of Anokhin (in Cole & Maltzman, 1969) on "Cybernetics and the Integrative Activity of the Brain" (pp. 840-856) given at the 1966 International Congress of Psychology in Moscow, is in accord with the Pavlov-Sechenov tradition. Apparently, Berlyne thinks Russian "reflexive (reflektorny)" point of view is to be clearly distinguished from "stimulus-response" psychology. According to Anokhin, in "Ivan P. Pavlov and Psychology" (Chapter 7 in Wolman, 1968, pp. 131-159), Pavlov observed the manner in which the conditioned reaction precipitated "signal" activity of the central nervous system. This "warning" character reflex enables the organism to adapt itself to events which are not yet taking place (foreseeing, predicting). Pavlov put forward the idea of a "dynamic stereotype" that structures the situation in which the conditioned reflex acts. Pavlov and those who followed him seemed to believe that the "second signal system," involving verbal stimuli and verbal responses (reciprocal stimulation), being peculiar to human behavior, gives rise to behavior which in far-reaching respects differs from that produced by the conditioned reflexes of the "first signal system."

behavior. Such behavior shows a close temporal relation between stimulus and response, assuming that it depends upon straight-through connections in the CNS (Hebb, 1966, p. 83), and tends not to function in a mediated or hypothesis-testing manner.[21] This division of behavior into classifications of intelligent and reflexive may be exemplified by an encounter with a tree. The intelligent organism perceives a plant and understands something about vegetative life, whereas the "reflexive" organism sees a set of stems, leaves and colors. This division may be expressed diagrammatically:



Hebb (1966, pp. 82-83) in an almost parallel discussion of behavior uses a spider spinning a web and a man ploughing a field as his examples. Both are seeking to obtain food, but one is planning and the other is not. The important difference is that some behaviors show a close temporal relation between the stimulus and response. The type of behavior demonstrated by the web-making spider is cue-dependent or sense-dominated and, within the proposed frame of reference, such behavior would be termed *reflexive*. The other behavior depends upon mediating processes, such as ideas and thinking, and would fall into the classification of *intelligent* behavior. As Hebb points out, behavior is fundamentally an adaptation to the environments, therefore both reflexive and intelligent behaviors need the informational input from the senses, that is, all behaviors are affected by sensory feedback at all times. The distinctive criterion is the mediational aspect so that the higher the behavior the more symbolic mediation there tends to be, but even highly logical behaviors require sensory guidance to permit evaluation and maintain schema-with-correction. Therefore one may say that behavior may be reflexive without being intelligent, but behavior may not be intelligent without some aspect of sensibility and/or the use of acquired reflexive capabilities.

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[21] Berlyne (1965; p. 9) in a discussion of the shortcomings of S-R psychology, wherein he attempts to clarify his "integrative neoassociationism," points out that S-R theory fails to account for attention and stimulus-seeking behavior, as well as the processes within the organism (p. 17). He also holds that S-R psychology tends to resort to simplified experimental situation in its methodology, which are inadequate for the necessary accounting.

Within the behavioral realm, the intelligently behaving organism may be said to adapt to or to manipulate the environment, often by combining learned reflexive capabilities to cope with new situations and events (usually in combinations not previously employed), to make necessary adaptation more probable. Adaptation is understood to be an active process which is stimulated or inhibited by feedback to the organism from one or a combination of the three environments; namely, genetic, internal, external (page 2-16). This feedback would be positive (confirming) or negative (non-confirming) according to the meanings attached to environmental symbols and objects.

Environmental symbols and reciprocal interaction.- An environmental symbol or object may take any form, for it is the intelligent organism's perception of that form and the attachment of meaning to the perceived form which controls the nature and degree of adaptation. This may be understood as an evaluative process, and as such would be most relevant to an interpretation of the behaviors of the intelligent organism's transactions in a social situation. The intelligently behaving organism, henceforth identified as Alpha, interacts with objects and cultural agents who are significant figures of the external environment, to be identified as Beta(s). The intelligently behaving organism may himself be a Beta, insomuch as he establishes goals or expectations for evaluating his own behavior. Alpha compares his behaviors to Beta in two ways; namely, Alpha responds to certain cultural and social expectations imposed by the Beta agent, and Alpha behaves in terms of his own expectations about the probable supportive or non-supportive behavior of Beta (usually in terms of acceptance-rejection and/or approval-disapproval) in response to Alpha's doing and/or being in proximity to Beta. The dynamics of these evaluative behaviors may be more clearly understood by referring to Figure 2.02 on page 2-34, which serves to demonstrate a core concept of the dyadic interaction model for the study of human development and the central processes required for intelligent (adaptive), talented (valued), and creative (bringing into existence) behaviors. To avoid reification as entities, a tendency when one employs nominal terms, the three forms of behavior have the status of multidimensional **attributes**. Each form of behavior is subject to the processes of evaluation, either by cultural agents (Betas) or one's Self (Alpha), and reciprocal stimulation--a dyadic and/or polyadic phenomenon analyzed at its beginning during infancy in terms of four developmental principles set forth by Harriet Rheingold (pp. 1-17) and discussed by R. R. Sears (pp. 36-39) in H. W. Stevenson's seminal monograph of "Concept of Development" (1966).

If there is continuity in the form of confirming feedback between the behavior and Alpha/Beta expectations, no adaptation (secondary behavior in cybernetic terms or accommodation in Piagetian terms) is necessary. Should there be discontinuity between the behavior and Alpha/Beta expectation, adaptation is necessary to the degree that Alpha has attached meaning to these environmental symbols.

Definition of intelligent behavior.- Intelligent behavior cannot be understood as an S-R connection, or as response to external stimuli. Such behavior would be simply reflexive, habitual, cue-dependent, sense-dominated, or in ther terms of this chapter such behavior is stimulus-bound reflexibility. Granted an intelligently behaving organism is capable of attending to stimuli selected from its genetic, internal, or external environments, the level of intelligent behavior may be measured or evaluated most effectively according to the level of adaptation (including the use of previously-acquired reflexive capabilities) in relation to the degree of environmental complexity. This statement means that the higher the degree of environmental complexity to which the organism can adapt successfully, the higher the degree of intelligent behavior.

The definition of intelligent behavior may be summarized in a sentence. Intelligent behavior is an adaptive act or sequence responses controlled by a central process which responds according to the learned meaning attached to environmental symbols or objects and events encountered. From this definition, three principal factors or concerns may be extracted; namely, (a) the nature of a central process which controls, guides, or directs behavior, (b) the nature of adaptation, and (c) the method by means of which meaning is attached to environmental symbols, objects, or events. The final factor appears to have been the dominant concern of earlier experimental psychologists.

Intelligent, talented, and creative behavior.- Earlier in this chapter the point has been made that too many professional people in addition to the lay public use the terms intelligence, talent, and creativity in the nominal sense and consequently look upon them as entities or essence concepts of intellectual qualities. There are current warnings against this approach over and beyond Rowland & McGuire's Emergent Views of Intelligent Behavior: Men and Their Ideas (1968e) wherein they hold that central processes organized through experience, personality, and social behavior are facets of the same phenomena. Their dyadic interaction model would suggest that becoming and behaving as a human being guided by organized central processes occurs only when a relatively biointact, biocompetent developing organism (Alpha) encounters reciprocal stimulation in dyadic interaction with cultural agents (Betas) as depicted in Figure 2.02 on page 2-34 above.

Learning as organization of experience.- Experience is the relationship of familiarity between the organism and its three interacting environments; namely, biological heredity, one's self, and a social heritage (represented by cultural agents). In the theory developed in this report, "experience" brings about transformations in the organization (or schemata) of central processes (Berlyne, 1965, pp. 113-123). The "equilibration," to use Piaget's term (1961), is brought about by encounters with discontinuities in one or a combination of three interacting environments (the genetic or gene-controlled, internal or neuro-endocrine, and external or nutritional-social-psychological) which form the nexus of "being human."

The nature of Self.- In terms of the dyadic interaction model, a Self or personality becomes an important facet of the internal environment as a consequence of the reciprocal stimulation between the developing organism (Alpha) and cultural agents (Betas) who are objects of identification in the external environment. The most significant Betas who provide models in social learning are parents (close-tied authority figures with emotional involvement in the new "individual replacement"), more remote adult authority figures such as teacher, and age-mates (same sex and other sex) who can accept, avoid, reject, or isolate the new member of a human society.

Translation to a research model.- The dyadic model may be translated into a research model where the behavior (B) to be explained or predicted is set forth as a function of antecedent underlying potential capabilities (P_a) assessed at some prior time, expectations or attitudes $E_{a.b}$) assessed in Alpha with reference to Betas, and the probable evaluations of Alpha expressed in terms of antecedent responses ($R_{b.a}$) of Betas to Alpha (McGuire, 1961a).

Theory and Criteria of Talented Behavior

The explanation and prediction of various kinds of talented behavior both require an underlying theory or model such as the one set forth in this chapter, a set of relevant criterion measures, and suitable methods of mapping out and combining the promising indicators or dimensions of what is being studied. A schematic diagram of a model for research in human talent has been set forth in the first published report of the project by McGuire (1961a). Essentially, a significant portion of the observed and valued behavior of an individual may be represented in the form of an equation whose terms can be identified empirically and, when confirmed, be transformed to a linear mathematical model for necessary computations.

$$B_a = f(P_a, E_{a.b}, R_{b.a}), S_a, G_{a.b}, C_{ab}$$

The model proposes that various kinds of talented behavior, assessed by criterion measures, are a function of several kinds of variables. One set is within the person (a) but is influenced by cultural agents (b) such as parents, peers, and teachers. These variables involve, first, potential cognitive, perceptual, and other abilities as well as the deeper elements of personality (P_a); second, expectations about one's own behavior and the probable responses of significant others, often expressed as attitudes ($E_{a.b}$); and, third, responses of other persons to the individual concerned, experienced in terms of pressures imposed upon the one observed ($R_{b.a}$). At least three kinds of modifying influences have to be considered. One is the sex-role identification of the individual and the sex-typing of socialization pressures upon him or her (S_a). Another, not included in earlier paradigms, is the generation or age-mate society to which the person belongs (or refers) and wherein other may accept, avoid, reject, or isolate the one being observed ($G_{a.b}$). Finally, there is the situation, or context of behavior (C_{ab}), such as a community or school setting which provides an institutional framework along with certain learning opportunities and impersonal expectations (or the setting in which a natural or a laboratory experiment takes place). Incidentally, a model for the study of learning in our attempts to upset predictions by the introduction of educational teleses (managed grouping, enrichment and changes in ways teachers work with students, or various kinds of counseling) also involves the same sets of variables. The paradigm thus reminds the investigator of the variables to be considered in the design of natural experiments involving human learning.

The criterion problem has been solved to the satisfaction of the research group in the preparation of the last HTRP report (McGuire, Jennings, Murphy, & Whitseide, 1968). In general, *a talent is a pre-eminent aptitude, or a superior ability, either natural or acquired, or a capacity for achievement or success*. Talented behavior (B_a), however, involves both personally-significant and socially-valued competencies, including signs of creativity, recognized as such through performances or products which can be evaluated by other persons. In the junior high school, the term refers not only to various kinds of academic achievement, measured by objective instruments and evaluated by teachers, but also to other forms of behavior appraised by one's age-mates and older persons. Succeeding chapters state and test the proposition that there are observable transformations in the behavioral capabilities of boys and girls as they make the transition from pre-adolescence (PA) to early adolescence (EA) with pubescence and change in body image.

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CHAPTER III

THE CHANGING POPULATION

During their junior high school years, the boys and girls studied in the four communities underwent three kinds of influences making for change. First, while the majority of them were undergoing the transformation from being a child or juvenile to appearing and living as an adolescent, the very communities in which they lived were in a period of startling transition into a new era. Second, the years of transformation were marked by the loss of friends and acquaintanceships because families moved away. Third, throughout this period, the emergent adolescent society was taking shape. As proposed in the discussion of the catalytic model in the second chapter, each boy and each girl was encountering the emergent adolescent society in which both members of the same sex and those of the other sex had to be considered. Age-mate acceptance, avoidance, rejection, and/or isolation were encountered in a rather more complex setting than in the somewhat separated peer cultures of boys and of girls during childhood.

Family Backgrounds and Community Patterns

Families are the basic social units of all American communities. But there is no such entity as "The American Family." Most professional people know that human beings tend to talk in terms of ideal types--of "what ought to be." They appreciate "what really is" because they have had experiences with different kinds of families.

Many people find that a flexible frame of reference helps them clarify ideas. A framework guides one in complex situations where a number of possible patterns are involved. It tells an observer what elements could go together and what behavior to expect. This section briefly outlines such a frame of reference which anyone may modify for personal use. It deals with family background and community patterns which, although they appear to vary, have a number of elements in common.

A Schematic Diagram. - The elements of a situation often can be represented by a schematic diagram which indicates major variables and their relationships. The diagram presented in Figure 3.1 shows how we think of the parts of a community as they fit together.[1] It is a frame of reference which helps us identify the probable places of families in a community.

The cornerstone of the "community block" is the family as a social structure or institutional pattern. A community is known by the kinds of families it has. Research tells us that the several types of families present, and the numbers of each, influence the make-up of any community. For instance, a high status suburb like Alamo Heights differs in proportion of each type of family when compared with the lower status suburban communities around San Antonio. To represent the differences in the diagram from one community to another, the horizontal social class lines would have to be drawn with varied spacings. Again, the vertical lines separating minority groups would vary for Center City (which has Anglo, Latin-American, and Negro families) when compared with Jonesville (a middle-western community with only one colored family and several ethnic groups; Warner & Associates, 1949). Hence, for any specific community, the proportions in the community block depend upon the distribution of family backgrounds.

Seven Community Structures. - The family is only one of seven social structures in which husband and wife, son and daughter, interact in the community. Beliefs and sentiments, attitudes and values held by family members often are a function of where and how they fit into other community structures. A man not only is a husband

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[1] The diagram first appeared in an article by Carson McGuire, "Social Stratification and Mobility Patterns," Amer. sociol. Rev., 1950, 15, 195-204.

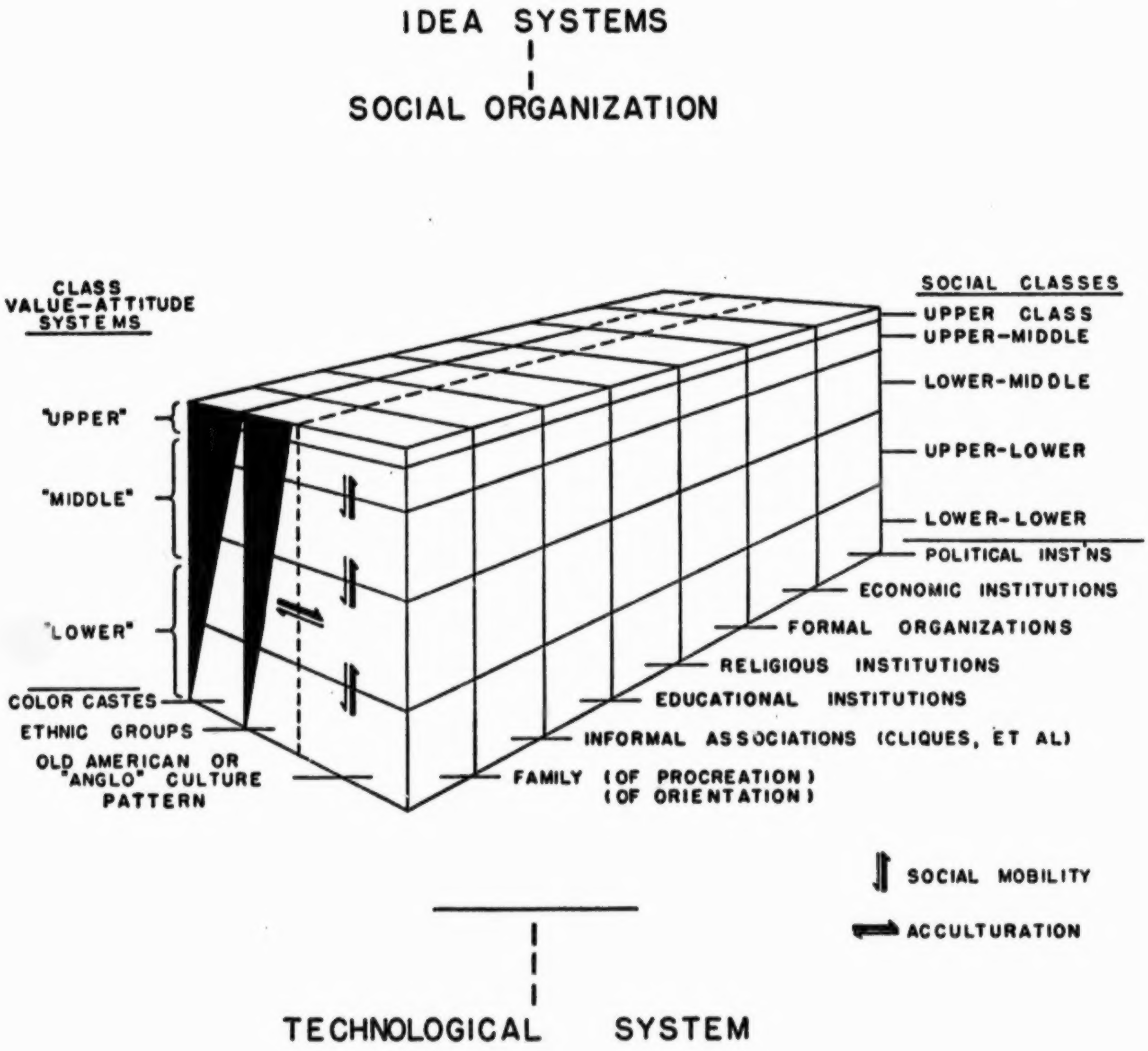
IDEA SYSTEMS
SOCIAL ORGANIZATION
CLASS VALUE–ATTITUDE SYSTEMS
"UPPER"
"MIDDLE"
"LOWER"
COLOR CASTES
ETHNIC GROUPS
OLD AMERICAN OR "ANGLO" CULTURE PATTERN
SOCIAL CLASSES
UPPER CLASS
UPPER-MIDDLE
LOWER-MIDDLE
UPPER-LOWER
LOWER-LOWER
POLITICAL INST'NS
ECONOMIC INSTITUTIONS
FORMAL ORGANIZATIONS
RELIGIOUS INSTITUTIONS
EDUCATIONAL INSTITUTIONS
INFORMAL ASSOCIATIONS (CLIQUES, ET AL)
FAMILY (OF PROCREATION) (OF ORIENTATION)
⇅ SOCIAL MOBILITY
⇄ ACCULTURATION
TECHNOLOGICAL SYSTEM

Figure 3.1 Schematic Diagram of a Community.

and a father but also one of the boys, an alumnus, a church elder, a Rotarian, a business executive, and a leading Democrat. A married woman is not necessarily just a wife and mother. She also is a bridge player, a parent, a member of a church circle, a clubwoman, a consumer, and a voter. Men's and women's personalities, at least in part, are functions of past and present role behaviors in family, educational, religious, economic, and political institutions as well as in informal and formal associations (Newcomb, 1950).

These seven community structures also influence the behavior and outlook of youth. Girls who tell interviewers, "My mother sees me only as a daughter," or "Miss Jones knows me only as a pupil," not only are referring to home or school relationships but also to age-graded ways of acting expected of them. We have heard girls make observations such as, "Only Jim, my boy friend, Miss Smith, and some of the Sub-Deb girls treat me as a person." Outside of these close, informal associations they have social roles as daughters and sisters, dates, students, church workers, club members, and baby sitters (Brown, 1965, pp. 152-196). A boy also has role behaviors beyond being a son and brother; and, like others in his family, he has his own reference groups (Merton & Kitt, 1950). People, young and old, refer to others with whom they share value orientations.

Systematic observation, focused interviews, and free response data tend to show that such role behaviors and reference groups vary according to the type of family. Only a few persons from families "across the tracks" have had an opportunity to learn all of the roles known to middle-class family members. Many of the differences in observed behavior and in expressed value orientations are brought about by variations in experiences and in meanings attached to them. Meaning of an experience, in turn, seems to vary according to family background and to the models or reference-figures encountered within structured and unstructured situations in the community.

Most situations are structured in the sense that certain kinds of behavior are expected according to age and sex, family status and immediate concern. This is especially true in the four institutions other than the family--educational, religious, political, and economic. A pupil, a parent, or a teacher usually can tell what is expected in the school, although not everyone conforms. The attitude of worship seldom can be avoided within a church even if the form may vary from Episcopal to Pentacostal, from Catholic to Lutheran. There are alternatives in economic and political life but almost everyone can anticipate the role of a buyer or a seller, of a boss or an employee, of a voter or a taxpayer.

Being structured, formal organizations permit their members to have contacts with people of various family backgrounds without the necessity of intimacy. Clubs and other associations with constitutions and bylaws serve to tie together the parts of a community. Almost everyone knows how to behave in a meeting. In P.T.A. gatherings people have sat through the prolonged business session, hoped that the speaker would prove interesting, and anticipated the talk and refreshment afterward. But it is only in the informal life of the community that human beings can move into the relaxed, intimate association which depends upon a common understanding of an unwritten code of behavior. People who commonly come together to talk or dine, to plan or play, usually share value-attitudes and express similar value orientations. Acceptance within relatively unstructured informal associations, especially in one another's homes, is the crux of status reputation.

The Social Classes. - Like people all over the world, Americans place a value upon level of informal and formal participation and upon moral reputation. A consequence is the illusion of a social class system--an illusion by which most Americans live in communities large and small. It is an illusion because only a proportion of families maintain the same relative position in the upper, middle, and lower classes through several generations. At any particular time and place, the assign-ment by other people of persons and families to status positions is very real. It influences people and their life style. The illusion of a stratified system stems from the fact that social mobility--change of status from an original family background--requires time. The first prerequisite for social mobility in the U.S.A. is "getting an education."

Generally speaking, in America, one of every four or five persons moves upward at least one acceptance-level during his or her lifetime (McGuire, 1950, pp.200-203). The trend is upward for at least three reasons. First, there is a difference in birth rate; lower status families usually have more children than do middle and upper class families. Second, the American economy is making it possible for more and more people to live a middle class way of life whether they wear white or blue collars to work. Third, there is the downward mobility of some persons--not more than one in twenty or twenty-five--in each generation. Consequently, on the average, about three of every ten boys and girls born into upper-lower and lower-lower class homes are destined to be mobile upward at least one step. On the other hand, perhaps only one in ten middle class youth succeed in making a significant upward shift. A good many more start out to "get ahead" and, when balked, they often have aspirations for their children. In the present Zeitgeist, however, the key to successful mobility increasingly is going to be the capacity to acquire a learning set such that one finds stability in the course of intellectual change (Keppel, 1966).

The status system is pretty much the same everywhere but not every community has all of the class levels. The several kinds of neighborhoods seem to be fairly accurate guides to the distribution of people in a city or town. In the HTRP, we have worked in four Texas communities which vary somewhat from one another. In each place, informants demonstrate that they can map out and agree upon dwelling areas and assign relative values to them. When systematic samples of families are interviewed in each status area, a significant proportion conform to a pattern in terms of social status and expressed value orientations. Further, there often is movement from one area to another as families or their offspring improve social class position.

When new families come to a community it seems that tenative appraisals of status are made. Probably everyone who has moved into a new community has encountered variations of the following questions. What do you do? Where do you work? Where do you live? Who lives nearby? What is your church? Where did you go to school? In a sense, the index of status characteristics developed by Warner, Meeker, & Eels (1949) is a set of scales which rate answers to such questions. The questions appear to be a way of placing families and their members prior to interaction in formal and informal activities. The critical test of status reputation, however, is membership in and reference to these formal and informal associations or the lack of such affiliation on the part of members of a family.

Value Orientations. - The idea systems held by people do not necessarily correspond to their place in the social organization. In our research, we have been impressed by the fact that individuals do not always adhere to the beliefs and sentiments, the attitudes and values of the social class in which their family has been placed by others. Although a family may be looked upon as lower class in terms of either socioeconomic status or evaluated participation in a community, some or all of its members actually may have middle-class value orientations. These family value orientations and the influence of age-mates upon one's outlook are considered in the analyses of HTRP data.

The schematic diagram shows three class-typed value-attitude systems--"upper," "middle," and "lower." They are convenient reference groups for implying differences in life style based upon the very real illusion of a social class system. There are sufficient numbers of persons and families at each level to give characteristic definitions of what is an acceptable life style. The core values of each level seem to change but slowly.[2] Middle class values, which tend to be individualistic, are regarded as dominant in American culture because of the number, position, and influence of such people in the educational, religious, organizational, economic, and political life of both large and small communities. Upper class values, though, are looked upon as superordinate despite the relatively small number of families involved. Power and deference factors set these families apart. At the other end of the scale, lower class values could be referred to as alternative orientations or definitions of the situation. Mixtures of outlooks, however, characterize the upper-middle and lower-class individual and his family.

Instances of the dominant idea system are found in expectations which middle-class oriented families have about schools in our communities. Parents want their children "to get an education" so they can "get and hold a good job" in order that they "won't have to work as hard as I've had to get where I am." The minimum education is high school graduation, with at least some college preferred; and "the good job" is thought of as professional, executive, or white collar work. Nevertheless, there is ambivalence in that sons and daughters are "to make something of themselves" and yet they are to be taught "to be satisfied" with the status quo. The school is to turn out "good boys and girls"--obedient, honest, and responsible. The lower class child is expected to "overcome his bad faults or get out."

Minority Groups. - From one point of view, the largest "minority group" in American communities are persons of lower class backgrounds. Many of the children are affected by ESEA-1965 which provides Title I funds for "Education of Low Income Families" (Keppel, 1966, p. 192). There are, in addition, families affiliated with recognized minority groups. The three culture patterns--the Old American ("Yankee" or "Anglo"); the ethnic groups, and the color castes--are shown on the schematic diagram. The shading indicates that both the ethnic and colored groups have relatively fewer families at higher status levels and more at lowly valued socioeconomic and participation levels.

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[2] The research team has not had the kind of recent contacts in the four communities necessary to validate this statement during the re-shaping of the HTRP community. Nevertheless, research in comparable communities bears out the statement.

So far we have referred to differentiation in terms of age and sex, social status and value orientations. Two additional principles of inclusion and exclusion operate to separate out families defined as colored or placed in ethnic backgrounds. They are visibility and traditions held to be "foreign" to the major stream of American culture. Visibility characteristics, especially skin color, serve primarily as symbols--whiteness and purity, blackness or darkness and impurity. Such people can be categorized and stereotyped, if interpersonal relations are held at a minimum; consciousness of difference and projective mechanisms develop and persist. In the desire to keep families apart, and to prevent intermarriage, interaction is blocked in other community structures.

Being most visible, the Negro has experienced the largest number of caste-like barriers--implicit in the North, more explicit in the South until the 1965 Civil Rights Laws were enacted. The Latin American in certain communities, especially the mestizo and mojado (wetback), encounter somewhat similar discrimination. Dotted lines in the economic and political spheres are shown in the color caste segment of the schematic diagram. They denote, at least to some extent, the gradual breakdown of caste lines. The further crumbling of visibility barriers, beginning with higher education, could be a function of increasing recognition of status differences among Negroes as well as legislative and judicial action. It seems that Negroes from middle and upper class family backgrounds have many value orientations in common with their white and Old American counterparts, perhaps more than some ethnic peoples of equivalent status.

The factor of cultural tradition outweighs the visibility element in the case of ethnic groups. The major symbols of a variant tradition seem to be family name, religious beliefs, and certain kinds of formal organizations. To persist, the ethnic group (and the religious sect) has to maintain solidarity between children and their parents. Continuity through biological descent and a commonly shared religious tradition underlie the solidarity and the differences in family-life patterns among ethnic groups such as the Latin-American families in the HTRP communities.

When people cease adhering to a variant tradition and take over the ways of thinking, feeling, and behaving of either the dominant or alternative culture patterns of the "Old American" way of life, the process is called acculturation. When the habits, external appearance, and manners of the host people are learned but old value systems are retained, the acculturation is external in form. Most ethnic groups are acculturated to some extent. Some, however, are not. Acculturation may lead to assimilation, that is, participation in the main stream of community life. This has happened to succeeding generations of immigrants as they have been educated in American schools and moved up the social class system.

Family-life Patterns. - Differences in value orientations by status levels and cultural groupings foster discrepancies in family-life pattern. Consequently, role behaviors in the seven community structures tend to vary according to family background. People can learn a whole way of life which is quite different from that of their family of orientation. The study of marriage and family living as well as family life education has to consider not only the family of orientation but also those of procreation and gerontation. A male moves from son and brother to husband and father, to grandfather. A female moves from daughter and sister to wife and mother, to grandmother. The role behaviors vary by family background and they are modified by acculturation and mobility.

Communities in Transition

While the populations of the Human Talent Research Program were completing their elementary school education and going through the junior high school years, the very communities in which they lived were reshaping themselves as a consequence of the world-wide emergence of a new era in the lives of human beings.

The four communities, each in its own way, apparently were catalyzed into becoming something more than an agricultural or a distribution center as the result of forces and processes bringing about changes which few of the HTRP subjects, their parents, or their teachers possibly could recognize. In retrospect, the indicators of an emergent new era which were having an impact upon the four HTRP communities as well as others in Texas and the United States probably may be designated as follows:

(a) an incredible explosion of knowledge taking place not only in the United States but all over the world,

(b) the introduction of automation and the electronic computer--pools of persons either having to acquire new skills or find themselves "out of place" as the new era emerges,

(c) new systems of energy transformation and the utilization of materials in ways mankind had not believed possible,

(d) simpler societies losing the status of colonies and "leapfrogging into the future;" for example, shipping oil and other materials into the United States.

The data presented in this section illustrate our inference that each of the four communities was in a state of transition from being a center for a primary industry during the period when the HTRP students completed the elementary grades and attended junior high schools. The research team believes that Tables 3.1 summarizing population changes, 3.2 presenting comparative data, and 3.3 which concentrates upon characteristics by county, taken together, indicate the nature of emergent communities which no longer are centers for a primary industry such as agriculture. For the convenience of the reader, each of the communities has been given a pseudonym to be employed in this and subsequent reports; namely, (A) Ashton in Albert County, (B) Bandana in Bolivar County, (C) Centerville in Center County, and (D) Duneside in Dalton County. Some of the census figures have been altered slightly to preserve the anonymity of the communities who elected to enter into the research agreement. All alterations have been relative so the data presented herein are substantially correct.

The physical and economic changes in the four HTRP communities have produced an increasingly complex setting in which the boys and girls involved in the program found it necessary to grow up and learn to live. From predominantly agricultural communities to industrial complexes, from relatively stable populations to highly mobile families and communities, from small to large populations, each of these shifts produced new friends and resulted in the displacement of many former peers. Whether or not the increasingly changing populations and the increasingly complex community setting may be regarded as moderating factors to be represented in the catalytic theoretical model would be a matter of judgment. To permit the reader to make his own evaluation, a more detailed examination of each community might be apropos at this stage of the report.

The four communities in the Human Talent Research Program--Ashton, Bandana, Centerville, and Duneside--possess the usual similarities and differences residing in geography, ethnicity, and degrees of industrialization. All four communities have, during the life of the HTRP, found themselves in a period of transition into an ever-increasing industrialization and a consequent lessening of dependence upon

TABLE 3.1

Population Changes in Cities and

Counties by Decades, 1930 to 1960

City or County	1930	1940	U.S. Census 1950	1960	Est. 1962
Cities					
Ashton (A)	15,700	17,200	20,100	25,000	25,100
Bandana (B)	15,100	15,200	19,200	20,300	20,750
Centerville (C)	7,400	11,500	16,100	33,000	35,200
Duneside (D)	1,300	2,050	5,500	8,800	9,000
Counties					
Albert County (A)	65,200	69,500	70,400	73,000	73,050
Bolivar County (B)	50,500	51,300	39,900	34,450	34,500
Center County (C)	20,000	23,700	31,200	46,400	48,700
Dalton County (D)	5,300	5,900	9,200	15,500	17,300

TABLE 3.2

Comparative Data on Four Texas Communities

	A	B	C	D
	Ashton	Bandana	Centerville	Duneside
	Albert Co.	Bolivar Co.	Center Co.	Dalton Co.
Number of Farms in Counties over a Decade				
Number in 1956	3,600	3,200	3,600	330
Number in 1959	2,350	1,900	2,200	260
Number of Service Establishments, 1958				
In Cities	355	150	300	50
In Counties	175	60	265	35
Average Monthly Employment, 1962				
County Total	11,800	4,500	7,900	4,450
Mining (oil)	370	260	785	75
Construction	900	160	850	1,000
Manufacturing	5,000	1,900	1,250	2,250
Trade	3,000	1,200	2,800	670
Distribution of Labor Force on April, 1962				
Labor Force	26,150	12,125	15,100	7,130
Manufacturing	5,350	1,920	1,500	2,375
Non-Manufacturing	18,500	7,710	11,630	4,000
Agriculture	1,520	1,895	1,370	505
Unemployed	780	600	600	250
Retail Trade Establishment, 1958				
Located in City	590	450	430	185
Located in County	290	300	100	120
Motor Vehicle Registrations, 1962				
County	43,050	18,350	26,400	8,800

TABLE 3.3

Characteristics of Population by Counties

Characteristic	Albert Co.*	Bolivar Co.	Center Co.	Dalton Co.
Total Population	73,000	34,400	46,500	16,600
Anglo-American	66,400	24,500	31,750	11,650
Latin-American	200	1,400	10,750	4,150
Negro-American	6,400	8,500	4,000	800
Males	35,700	16,400	22,750	8,500
Females	37,300	18,000	23,750	8,100
Median Age (Years)	32.1	36	25	21.7
School Enrollment	15,691	7,700	11,700	4,200
Employed Labor Force	24,813	12,400	15,700	5,150
No. of Families	20,016	9,300	11,200	3,750
Median Income	4,264	3,247	4,805	5,350
Deposits ($1,000's)	95,000	41,800	121,400	24,000

*Two incorporated cities, Ashton and Borden, are in Albert County.

agriculture and/or ranching. Add to this a constant movement of segments of their populations to larger, more urban centers, and the picture of a period of transformation becomes even clearer. Although the schematic "community block" (Fig. 3.1) still represents their social organization, details differ from one place to another.

No community can be said to conform to the concept of modern suburbia; none of the four serves as a bedroom community for a larger city. In other respects, however, each of the four have undergone "suburban transformations": (1) increased residential areas, (2) increased industrial and retail shopping centers, (3) federally assisted projects for the extension and improvement of water, sewer, and power facilities, and (4) increased highway services leading to rapid transportation between neighboring population centers. At the same time, transportation has changed: railroads have declined; lower-class people have become bus passengers; middle-class people are no strangers to the airliner. Many students, especially during the junior high school years of the HTRP, rode to school by bus. A good number of these community changes took place in their entirety during the lifetime of the Human Talent Research Program.

There are differences in population growth, median ages of populations, median incomes, employment statistics, and bank deposits which are noticeable in the three initial tables of this chapter. As one example of differences, the median age of the population of Duneside is 21.7 years as compared with Centerville at 25.0, Ashton at 32.1, and Bandana at 36.0 years. Clearly, Duneside is an emerging community characterized by families with young children. Unless there is an opening in the fast-growing industrial complex at Duneside, young people tend to move away from such a community.

Two other differences are deemed of sufficient importance to be mentioned specifically. The first is that of ethnicity; the first percentage figure given (for the entire community in each case) is for Anglo-Americans, the second for Latin-Americans, and the third for Negro-Americans in each of the four communities:

Ashton, 90% Anglo, less than 1% Latin, 9% Negro

Bandana, 70% Anglo, less than 5% Latin, 25% Negro

Centerville, 68% Anglo, 23% Latin, 9% Negro

Duneside, 70% Anglo, 25% Latin, 5% Negro.

The figures for ethnicity among school populations may vary somewhat from total community percentage.

Median incomes in the four counties, not necessarily in alphabetical order, are $3,247, $4,264, $4,805, and $5,350. In the same order as that employed for median incomes, bank deposits for the four counties, Albert, Bolivar, Center, and Dalton, show (in millions of dollars) 41.8, 95, 121.4, and 24.

Ashton

The 25,000 people of Ashton attend 36 churches. The most representative congregations are Baptist, Methodist, Christian, Church of Christ, Episcopal, Roman Catholic, and Presbyterian.

Approximately 50 manufacturing concerns are located in or adjacent to Ashton. The relatively new plants include those which produce tabulating punch cards, pharmaceutical products, aluminum extrusions, processed foodstuffs and clothing. Other plants are concerned with the production of aluminum truck bodies, boats, and canoes. Employers represent their employees as being 33 per cent skilled, 40 per cent semi-skilled, and 27 per cent unskilled.

Industry has been attracted by a community-minded attempt to foster a healthy, diversified industrial development program with plants located in a very attractive Industrial Park. Factors contributing to the industrial development appear to be cheap electric power plus natural gas, as well as a labor force of 26,000 persons from Ashton and surrounding Albert County. As a consequence of its industries, businesses, and services, Ashton usually has less than three per cent unemployment each year.

The city of Ashton is served well in the area of transportation. The five railroads, 10 truck lines, buses (interstate and local), and a small municipal airport combine with an arterial highway and numerous local market roads to provide easy access to the city.

The Ashton Independent School District had nine elementary schools, one school for the handicapped, two junior high schools, and two senior high schools. These schools, not as yet integrated in 1963 when the data-gathering part of HTRP was completed, served 5,800 scholastics with a faculty of 290 teachers.

Bandana

The county seat of Bolivar, Bandana is nearer "East" Texas than any of the other three HTRP communities. The estimated 1962 population was 20,750 of which some 25 per cent were Negro. The Bandana population probably is the most stable of the four HTRP locales as seen in Table 3.1.

The community is a wholesale distribution center for a total trade territory population of over 250,000 people. In Bolivar County itself, agriculture still forms the leading source of "trade distribution money"; e.g., the county produces from 20-30,000 bales of cotton annually. Petroleum is second in monetary importance, and assorted small industries are third. Just as in Ashton, an Industrial District has been created outside the City limits to foster industrial growth. A tract of 280 acres has been so designated and set aside for continuation of the industrial development. Four railroads and five motor freight lines are available to serve industry and the community at large for transportation needs.

The people belong to 36 church congregations, mostly Protestant. Two hospitals, four clinics, and a city-county health unit serve the health needs of the county.

A junior college, supported by both county and state funds and fully accredited by the Southern Association of Secondary Schools and Colleges, is attended by almost 1,000 students. A parochial school has an enrollment of over 100 pupils. The public schools of Bandana have an enrollment of approximately 5,000.

School census figures (summarized in later tables of this chapter) show a very slow but steady increase in enrollment during the years the HTRP students attended public schools. Two junior high schools for white pupils serve as feeders for the one white senior high school; during the period under HTRP study, Negro pupils attended a segregated junior-senior high school. As in other communities of East Texas, the schools are now in process of becoming integrated.

Centerville

One of the oldest towns in the State of Texas, extending back to the days of the Republic, Centerville has maintained its early role as a cattle center. In addition, however, the area is engaged in petroleum refining, production of petrochemicals, metal extracting, cottonseed processing, food processing, and garment making.

The diversification of Center County's occupational picture is reflected in certain aspects of its growth curve. In 1950, Centerville was third in size among the HTRP communities. By 1960, it was the largest of the four. Adequate transportation facilities have helped to foster the rapid industrialization of Centerville and Center County.

The community has numerous churches. In addition to the usual Protestant congregations, a substantial number of people are members of the Roman Catholic

Church. Hospitals and medical centers make available more than average health care to the population.

Centerville is proud of its schools. Elementary schools in all parts of the growing city, a number of parochial high schools, three public junior high schools together with one comprehensive senior high school, and a junior college serve the community's youth. School enrollment (public) more than doubled in the period 1950-1962. HTRP participants attended school during the years of rapid growth. In addition to this factor of growth and resultant change, the attraction of many "out of state" families to new and growing industries resulted in a changing population for both the schools and the city. A greatly changed population and greatly varied expectancies were encountered by HTRP students during the years of the study.

Without reference to the approximately 1,000 students enrolled in the public junior college, the population diversity of Centerville's schools is interesting. Approximately 64 per cent of Centerville's public school enrollment is Anglo-American (including families of European ethnic origin), 26 per cent Latin, and 10 per cent Negro. The HTRP Negro-American students had little opportunity to be in school with non-colored age-mates since integration began in the ninth grade. Nevertheless, the schools now are moving quickly toward integration.

Duneside

Duneside is the smallest community participating in the Human Talent Research Program, but it is one of the most rapidly growing ones. The population has approximately doubled during the HTRP years. About 70 per cent of the present population is Anglo, about 25 per cent is Latin, and the remaining five per cent is Negro.

A recently acquired metal processing plant, a chemical concern, and oil and gas resources have added to the production of cotton, maize, rice, and cattle to contribute heavily to the economy of the city and to surrounding Dalton County. Transportation facilities include the usual railroad and motor services together with increasing dockage space and channels for deep sea boats as well as access to air transportation. They provide for easy, economical access to and dissemination of the local agricultural and industrial products.

The community has a large, modern, and almost (spacewise) adequate hospital. Thirteen churches, recently constructed hotels and motels, some private air fields, a newspaper, and a radio station complement Duneside's community services.

The school system is organized on a county unit basis and is composed of eight elementary schools, three junior high schools, and one senior high school. A school plant expansion program has been in operation for ten years in preparation for a mushrooming growth which has now carried the pupil enrollment to almost 5,000. A point of pride for school leaders is that their industrial arts program has been greatly expanded to prepare students who cannot attend college to enter some trade upon completion of high school. Unlike the other communities, the colored HTRP boys and girls have attended junior and senior high schools along with Anglo-American and Latin-American age-mates.

Families on the Move

As a factor in the years of transformation for the HTRP scholastic population, one only gradually becomes aware of population mobility and other concomitants of community change. For this purpose, and again referring to the schematic diagram, a brief examination of census figures (Tables 3.1 - 3.3) seems to be in order. Each of the four cities showed population increases from 1930-1960, but Bolivar County (Bandana) found its population reduced from 60 to 34 thousand. Almost fifty per cent of the county's population was lost in the thirty year period; this is reflected in the reduction of farms from 3200 to 1900 within a decade (Table 3.2).

Questions may be raised when there is such a population change in one city and its surrounding county but not in others. Who left? With the building of the industry, who moved in? What is the significance of the median age of 36.0 years in Bandana (Table 3.3) for the entire community and its schools? What are the differences in community expectancies between Bandana and Duneside (21.7 years mean age) when one of the two communities obviously is composed of an older culture? What effect can one anticipate in the holding power of the community, its occupational milieu, and its schools? What of the wealth in the older and the younger communities? Who, of the scholastic population, continued from Grade VII to Grade IX; and who did not continue? In other words, what are the combined effects of population mobility and a changing community?

To provide evidence for the nature and extent of population mobility, families and their children moving from one location to another, a number of tables have been constructed in addition to those supplying census data (Tables 3.1, 3.2, and 3.3). For each location--Ashton (A), Bandana (B), Centerville (C), and Duneside (D)--Table 3.4 traces the original seventh-grade enrollments (total 1,792) continuing to the ninth grade (only 1,311 in the four locations), and indicates the number who either left school or transferred out to other schools (total 481) as well as those who enrolled (transferred in) as new students (total 314) during the three-year period.

Table 3.5 summarizes the number of students moving from Grade IX into Grade X in each community. Of the 1,311 students of the four school systems who responded to HTRP instruments in both Grades VII and IX, only 923 continued into Grade X in a senior high school at the same location. Thus a total of 388 either transferred to another school or left school (as drop-outs) during the hiatus between the 1959-

TABLE 3.4

Population Distribution from Human Talent Research Program Grade VII (1957-58) to Grade IX (1959-60).

Classifications		School Community Locations				Totals
		A	B	C	D	
		Original Grade VII Enrollment				
	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
Enrolled		429	352	684	327	1792
		Observed Grade IX Enrollment				
	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
Enrolled		456	290	603	276	1625
		Original Students Continuing to Grade IX				
	Boys	185	116	261	129	874
	Girls	173	126	224	97	620
Enrolled		358	242	485	226	1311
		Original Scholastics Leaving or Transferring*				
	Boys	34	65	115	53	267
	Girls	37	45	84	48	214
Enrolled		71	110	199	101	481
		New Students Enrolled from Grade VII to IX				
	Boys	57	28	64	34	183
	Girls	41	20	54	16	131
Enrolled		98	48	118	50	314

* Texas schools did not, and still do not, have a pupil accounting system which permitted a record of boys and girls who left school as "dropouts" and those who transferred to another school either in the same community, or to another either within or outside of the state. After the passage of ESEA-1965, however, the Texas Education Agency has a task force working upon the problem since the reduction of school-leaving (or decrease in dropouts) is going to be an index of the relative efficacy of Title I programs initiated in local school districts.

TABLE 3.5

Population Data from the Human Talent Research Program Grades IX (1959-60) to X (1960-61) with Transfers and School Leavers since Grade VII (1957-58).

SEX	School Community Locations				Totals
	A	B	C	D	
Original HTRP Subjects Enrolled in Grade IX (1959-60)					
Boys	185	116	261	129	691
Girls	173	126	224	97	620
Enrolled	358	242	485	226	1311
Enrollments or Original HTRP Subjects in Grade X (1960-61)					
Boys	161	112	184	107	564
Girls	150	109	176	75	510
Enrolled	311	221	360	182	1074
Original HTRP Subjects Continuing from Grades IX to X					
Boys	124	105	156	86	471
Girls	130	106	152	64	452
Enrolled	254	211	308	150	923
Original HTRP Subjects Transferring, or Leaving, Grades IX to X					
Boys	61	11	105	43	220
Girls	43	20	72	33	168
Enrolled	104	31	177	76	388
Total Transfers and School Leavers, Grade VII to X					
Boys	95	76	220	96	487
Girls	80	65	156	81	382
Total	175	141	376	177	869
Original HTRP Grade VII Enrollment					
Boys	220	181	374	181	956
Girls	209	171	310	146	836
Enrolled	429	352	684	327	1792

60 and the 1960-61 school years, making a total of 869 who either transferred from or dropped out of the public schools of the four communities between 1957-58 and 1960-61.

Two additional tables permit analyses in terms of sex and community, cultural backgrounds, family status, and levels of mental function (IQs) for those who remained in the schools of the four communities from Grade VII to Grade IX as well as those who either dropped out of or transferred from the public schools during the same three years. Table 3.6 classifies the 1,311 continuing students. Similarly, Table 3.7 categorizes the 481 who either transferred or left school. A separate study of drop-outs and delinquents has been completed by Kelly (1962) and is to be reported for Project No. 1138.

Among the four communities, of the original Grade VII students who continued to Grade IX, the highest holding power apparently was in Ashton, 83 per cent; Bandana and Duneside each lost approximately 30 per cent of the original Grade VII enrollments (Table 3.4) while Centerville lost 34 per cent of its original Grade VII enrollment. Continuing students (Table 3.6) may be compared with school leavers and transfers (Table 3.7) in terms of several categories; namely, sex, cultural (ethnic and racial) background, family status, and level of mental function. The high number of "unclassified" students (those for whom no data or incomplete data were available) leaves any conclusion uncertain, but certain broad observations may be noted.

Sex

Of the total students (Grade VII-IX), 72 per cent of boys remained in school; 74 per cent of girls continued. By communities, retention was a follows: Ashton males, 84 per cent; females, 82 per cent; Bandana males, 64 per cent; females, 74

TABLE 3.6

Distribution of Original Grade VII Students Who Continued to Grade IX According to Sex-Role, Cultural Background, Family Status, and Mental Function.

Sex		School Community Locations				Total
		A	B	C	D	
	Male	185	116	261	129	691
	Female	173	126	224	97	620
		358	242	485	226	1311
Cultural Background[1]						
Anglo	Male	154	93	152	88	487
	Female	148	91	116	66	421
Latin	Male	4	1	51	26	82
	Female	0	1	50	20	71
Negro	Male	15	17	26	6	64
	Female	18	27	29	7	81
				Unclassified		(105)
Family Status[2]						
UC-UM	Male	29	15	23	5	72
	Female	26	10	17	7	60
LM	Male	61	23	45	20	149
	Female	57	24	38	19	138
UL	Male	43	40	68	50	201
	Female	50	41	52	40	183
LL	Male	19	20	31	23	93
	Female	10	30	29	11	80
				Unclassified		(335)
Mental Function[3]						
High	Male	30	15	46	16	107
	Female	27	11	31	11	80
Average	Male	104	77	130	72	383
	Female	103	73	111	55	342
Low	Male	26	9	27	23	85
	Female	22	20	27	18	87
				Unclassified		(227)
				Grand Total		1311

[1] Classification according to subculture were made in consultation with school personnel in 1957-58. Subjects with no subculture punched in the appropriate IBM column have been entered as "Unclassified."

[2] Based upon Index of Social Status (ISS) calculated as directed in McGuire & White (1955).

[3] Based upon relative IQ's as measured by the California Test of Mental Maturity (CTMM).

TABLE 3.7

Distribution of Original Grade VII Students Who Did Not Continue to Grade IX According to Sex-Role, Cultural Background, Family Status, and Mental Function.

	Sex	School Community Locations				Total
		A	B	C	D	
	Male	34	65	115	53	267
	Female	37	45	84	48	214
		71	110	199	101	281
Cultural Background						
Anglo	Male	31	38	76	43	188
	Female	30	25	48	38	141
Latin	Male	1	0	36	9	46
	Female	1	1	31	9	42
Negro	Male	2	27	3	0	32
	Female	5	19	3	0	27
				Unclassified		(5)
						481
Family Status						
UC-UM	Male	0	0	4	0	4
	Female	3	0	5	0	8
LM	Male	9	6	22	3	40
	Female	6	5	15	7	33
UL	Male	6	17	26	20	69
	Female	7	18	17	14	56
LL	Male	2	29	20	4	55
	Female	4	16	18	4	42
				Unclassified		(174)
						481
Mental Function						
High	Male	2	23	13	7	45
	Female	6	19	9	7	41
Average	Male	15	27	51	21	114
	Female	19	15	45	20	99
Low	Male	3	3	12	3	21
	Female	4	4	10	0	18
				Unclassified		(143)
				Grand Total		481

per cent; Centerville males, 60 per cent; females, 70 per cent; Duneside males, 70 per cent; females, 67 per cent. These figures for retention should be examined in the light of the descriptions for each of the four HTRP communities. The larger number of boys not continuing from Bandana might be due to the large Negro population or, equally possible, to the exodus of the county's population. The first hypothesis can be examined in light of cultural background; the latter can only remain a conjecture.

Cultural Background

A number of interesting facts can be derived from a close study of the enumeration data in both Tables 3.6 and 3.7, since the addition of entries in the two tables provides the original Grade VII distributions. In Ashton, 83 per cent of students classified as Anglo persisted in school; in Bandana, 71 per cent Anglo boys and 80 per cent of the girls remained; in Centerville, 70 per cent of both boys and girls remained in school; and in Duneside, 67 per cent of the boys and 63 per cent of the girls remained. Approximately 66 per cent of the boys and girls remained in Centerville and Duneside; the total percentage of Latin enrollment in Ashton and Bandana was so small as to be insignificant. This is indicative of either the nonenrollment or the withdrawal (school-leaving or transfer) of some Latin-American children from school before Grade VII in Albert County (200 Latin populations and Bolivar County (1400 Latins, according to Table 3.3).

Negro pupils in Ashton and Centerville remained at a level of approximately 90 per cent; in Bandana, less than 50 per cent are found in Grade IX. In Duneside, where the colored boys and girls were integrated with the Anglo- and Latin-American students, there is no record of drop-outs or transfers among the six boys and seven girls.

Family Status

Of children in UC-UM class, a total of 132 of 144 persisted from Grade VII to Grade IX. Of the 12 presumed transfers to private schools or to other public schools, three were from Ashton and nine from Centerville. None of the upper-middle or upper-class boys and girls in Bandana (where the "old families" tended to have their children go to the local public or parochial schools) and in Duneside (which as yet has not seen an established set of "old families" emerge) either left school or transferred out of the communities during the three-year period. Total LM class figures show 21 per cent drop-outs or transfers among the boys and 14 per cent among girls. Boys of UL class remained in school at a rate of 74 per cent; girls of this level lost 24 per cent of their number as transfers or drop-outs between Grades VII and IX. In the LL class, only 60 per cent of the boys remained while 65 per cent of LL girls remained. Proportionately, over the four communities, the offspring of LM, UM, and UC families (419 of 504) remained the most stable. Their families (85 of 504) did not tend to move from one community to another or permit them to leave school as frequently as did the families of UL (125 of 509) or LL status (97 of 270).

Mental Function

According to Table 3.7, 86 drop-outs and transfers were among the scholastics classified as "high"; 213 came from the "average" group; and 39 drop-outs and transfers were classified "low." In Bandana, only 26 "high" persisted, whereas 42 did not continue from Grade VII to Grade IX. This observation leads to the inference that in this rapidly changing community, the phenomenon of "families on the move" (population mobility) tended to deplete the number of relatively highly intelligent boys and girls to a greater degree than in the sister communities, each undergoing a somewhat similar set of transitions.

Any complete comparison in terms of mental functions and school retention is impossible, largely due to the fact that so many students (143) apparently have incomplete mental maturity test results.[3] There is, however, cause for concern over the large number of students whose functioning is estimated as high who either have dropped out of or transferred from school prior to Grade IX.

Fitting into an Adolescent Society

The analyses in preceding CRB Report 025 (McGuire, 1961 (a); or McGuire and Associates, 1960) has served to illustrate the part which peer stimulus value and age-mate acceptance played in the explanation and prediction of talented behavior among junior high school boys and girls. Qualities or attributes which made for acceptance, avoidance, rejection, or isolation by one's peers entered heavily into most evaluations of school progress by teachers. Moreover, they seemed to have something to do with achievement in the various subject fields as well as age-mate appraisals of talented behavior. What was the nature of group structure in the junior high school years which made expectations and pressures imposed by peers through acceptance and avoidance a significant element to be considered in the study of talented behavior? This section of Chapter III is designed to illustrate and, in part, explain what was involved in these phenomena.

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[3] Most of the subjects "unclassified" in terms of mental function did not complete either the language or the non-language parts of the California Test of Mental Maturity. The remainder enrolled in school but somehow managed to be absent for "testing days" or for scheduled make-up. From inspection of the subject files, a majority of these boys and girls apparently were members of culturally-deprived families (lower-class Anglo-Americans, Latin-Americans, and Negro-Americans).

Sociographic Representation of Age-Mate Acceptance

A graphic technique may be used to represent group structure and to estimate age-mate acceptance among boys and girls in the research population each year. For this report, a series of sociographs showing relations among age-mates has been selected from those prepared from sociometric valuations in Bandana. The phenomena described were similar in every other school location. Figures J-1, J-2, and J-3 are the sociographs obtained from valuations of one another by boys and girls in three elementary school designated, for convenience, X, Y, and Z. Most of the seventh-grade classes in Bandana were housed in these schools during 1957-58. During the next year, 1958-59, a large number of the boys and girls from the three elementary schools moved on to one of the two junior high schools, designated as school M. The housing of seventh-grade classes in elementary schools had been necessary until completion of the construction of a second three-year junior high school. Figures J-4 for the fall of 1958, J-5 for the spring of 1959, and J-6 for Grade IX in 1959-60 are sociographic representations of group structure in junior high school M during the eighth and ninth grades. Code numbers for each boy and each girl have been kept the same through the series of sociographs.

A standard procedure (Clark and McGuire, 1952) has been followed in the construction of each of the sociographs represented in the six figures. Sociometric valuations were made by each boy and girl in a school location by having them respond to a pair of stimulus items commonly used to estimate "age-mate acceptance." These items were included among sets of item-pairs at each administration. The validity of these nominations was checked by comparing them with nominations for "party with" and "not party with" (contingency coefficients, C=.80). The specific items were:

(1) Write below the names of three persons you would prefer to run around with most of the time. What grade is each one in?

(2) Write below the names of three persons you might not prefer to be with most of the time. What grade is each one in?

The names of persons so valued were entered upon the upper part of 5 x 8 inch cards, one for each boy and girl making nominations. The next task was to transfer all valuations by peers to the lower portions of the card for each of the persons nominated. This was done by members of the clerical staff in the Laboratory of Human Behavior. Entries were made under two headings; namely, PVR or "positive valuations received" and NVR or "negative valuations received."

Sociographic Sequence. - The next steps in the procedure were the determination of a sociographic sequence and the construction of the sociograph. Each sequence began with the boy or girl who had received the highest sociographic score

$$SS = PVR + MPV - NVR$$

where PVR and NVR had the meanings defined above and MVR meant "mutual positive valuations." The number of MPVs could be counted as readily as the PVRs and NVRs on each card since both valuations made and received were entered by name. As shown in the illustrative sociographs, the individuals nominated by the first person in the sociographic sequence were added to the list. In turn, the ones they nominated were added, as illustrated, until a sequence ended. This was a point of major cleavage, a number of which appear in the figures. Then a new sequence was begun with the card of the person remaining who had the highest SS value. After all individuals with positive valuations had been placed in the sequence, those with only negative nominations (rejected ones) were added (sociographic level 2). Then the names of isolates, with no valuations, were left (sociographic level 1).

The arrangement of the cards in sequence according to the list determined by the foregoing procedures facilitated the construction of the sociographs. As shown, an "X" was used to denote a positive valuation and an "O" negative valuation.

The standard procedure brought the positive valuations close to the diagonal and spread the negative ones farther away. As a consequence, clique structures usually were readily discernible from the graphic portrayal of positive and negative valuations which represented acceptance and avoidance. By and large, as shown in the illustrative sociographs, the clique structures were concentrated in the upper-left quadrant of most matrices. Toward the lower-right quadrant, small groups and pairs appeared most frequently. Within cliques, of course, there were some negative valuations of one another as well as the positive ones.

Sociographic Levels. - The next step was that of determining sociographic levels. In each sociograph, level "1" at the bottom was reserved for "isolates" or boys and girls who received no recognition from their age-mates. Level "2" was made up of individuals who received only negative valuations from persons preceding them in the sequence. Unlike the "isolates," the "rejected ones" were noticed by age-mates. Since only six sociographic levels could be assigned, some judgment was involved in determining the "break-points" for levels "6," "5," "4," and "3." The usual rule was to make the divisions at points of cleavage where new clique structures began. An alternative was to select a break-point such that individuals lower in the sequence were valued negatively by the persons in the sociographic level above them. Both types of break-points occured in the six illustrative figures, J-1 to J-6.

Index of Peer Status (IPS). - Next, the valuations entered upon the sociographs were employed to calculate indices of peer status (McGuire and Clark, 1952) for each boy and girl. The formula for obtaining the index for each subject was

$$IPS = \frac{PVR_s - NVR_s}{N_m} \pm \frac{D_s}{N_m}$$

where PVR and NVR were weighted by sociographic level, s, of the peer nominating a subject; D_s was the difference in sociographic levels between the nominator and nominee; N_m was the number of positive and negative valuations directed to the subject, but not less than three, the median number; and the sign (+ or -) of the correction factor was determined by the sign of the valuation factor preceding it. The resulting values of IPS were entered on the right-hand side of the sociograph as shown in each of the illustrative figures.

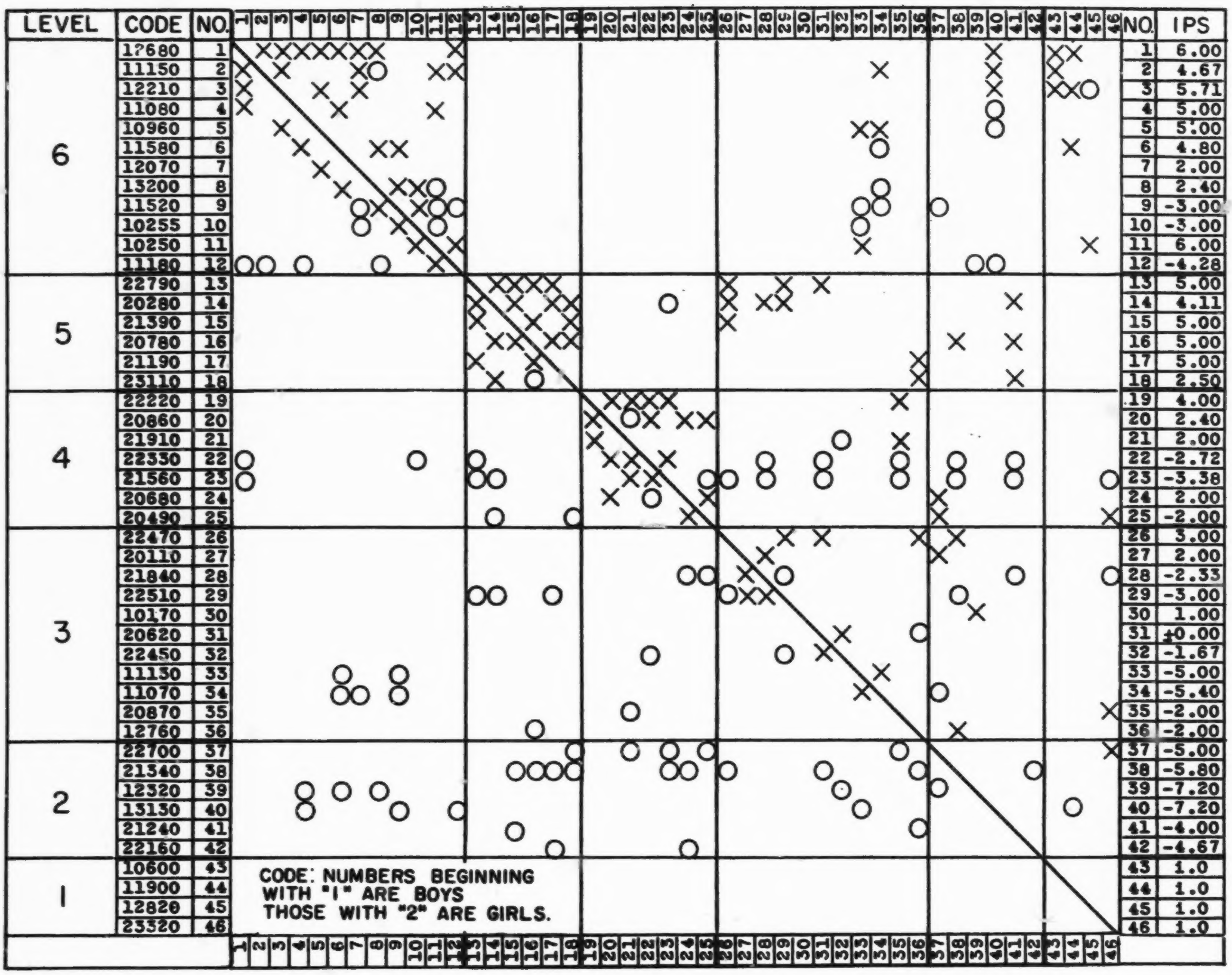
The resulting distributions of IPS values were regarded as estimates of age-mate acceptance and avoidance within a school location for the year or semester. Sets of IPS values may be compared within and between school locations and from one time to another. This was possible since they were derived by a standard procedure and did not depend upon the number in the population. Distributions of IPS values in Grade VII for the total research population, for example, ranged from -9.00 to +6.00 with a mean of 0.70 and a standard deviation of ±2.70 for those who recieved valuations from their age-mates.

Sociographs as Representations of Group Structures

Figures J-1 to J-6 were derived by the procedures sketched in the foregoing paragraphs. They permitted the identification of both tightly-knit and loosely-organized cliques as well as pairs, singly-valued, and isolated boys and girls at each school location over a period of three years. In other words, the sociographs are representations of group structure and, as such, give some meaning to the terms age-mate acceptance, avoidance, rejection, and isolation. In addition, they provide a background for understanding what is meant by the variable IPS Peer Status used in the research.

Age-Mate Acceptance Over Three Years. - The research team would like to make a suggestion to persons who care to examine the six sociographs closely. Select a boy or girl, or a number of boys and girls, in each of the seventh-grade elementary schools represented by figures J-1, J-2, and J-3. Check to see if they have entered junior high school M by reference to figure J-4. Then follow them through figures J-5 and J-6 to find the continuities and shifts in their relationships with other boys and girls. In many instances, a particular student has a similar pattern of acceptance throughout the school years. In other cases, however, there are dramatic changes in acceptance and in associations with other boys and girls. For those who would like to examine other data on the boys and girls represented in the sociographs, the code numbers are the same as those used on each of the IBM data cards and printouts employed in the research. A number of hypotheses could be tested, especially about the transition from the seventh-grade classrooms of elementary schools to a large junior high school by reference to sociographs J-1 to J-6 and the large amount of information gathered on the students.

Changes in IPS Values. - Table 3.8 has been constructed in order to facilitate the comparison of IPS indicators from one year to another during the junior high school years in Bandana. Code numbers for males (begin with "1") and females (begin with "2") can be placed upon IBM cards with relevant data regarding sociograph (J numbers for Junior High school years), sociographic sequence order (SS), and index of peer status (IPS) for electronic sorting to prepare such a table. If a student was in any one of three schools in that community during the seventh grade year (1957-58), he has an entry in column J-1 or J-2 or J-3. Fall and spring indices for the eigth grade are listed under J-4 (1959-60). The student's rank order (sociographic sequence) in a particular sociograph is shown on the first line. This information is given to aid in locating a particular subject on any one of the sociographs. Most of the students listed had IPS values all three years;



LEVEL	CODE	NO.	IPS
6	12680	1	6.00
	11150	2	4.67
	12210	3	5.71
	11080	4	5.00
	10960	5	5.00
	11580	6	4.80
	12070	7	2.00
	13200	8	2.40
	11520	9	-3.00
	10255	10	-3.00
	10250	11	6.00
	11180	12	-4.28
5	22790	13	5.00
	20280	14	4.11
	21390	15	5.00
	20780	16	5.00
	21190	17	5.00
	23110	18	2.50
4	22220	19	4.00
	20860	20	2.40
	21910	21	2.00
	22330	22	-2.72
	21560	23	-3.38
	20680	24	2.00
	20490	25	-2.00
3	22470	26	3.00
	20110	27	2.00
	21840	28	-2.33
	22510	29	-3.00
	10170	30	1.00
	20620	31	±0.00
	22450	32	-1.67
	11130	33	-5.00
	11070	34	-5.40
	20870	35	-2.00
	12760	36	-2.00
2	22700	37	-5.00
	21340	38	-5.80
	12320	39	-7.20
	13130	40	-7.20
	21240	41	-4.00
	22160	42	-4.67
1	10600	43	1.0
	11900	44	1.0
	12820	45	1.0
	23320	46	1.0

CODE: NUMBERS BEGINNING WITH "1" ARE BOYS THOSE WITH "2" ARE GIRLS.

FIGURE J-1 SOCIOGRAPHIC MATRIX FOR GRADE VII (1957-58) IN ELEMENTARY SCHOOL X, COMMUNITY B

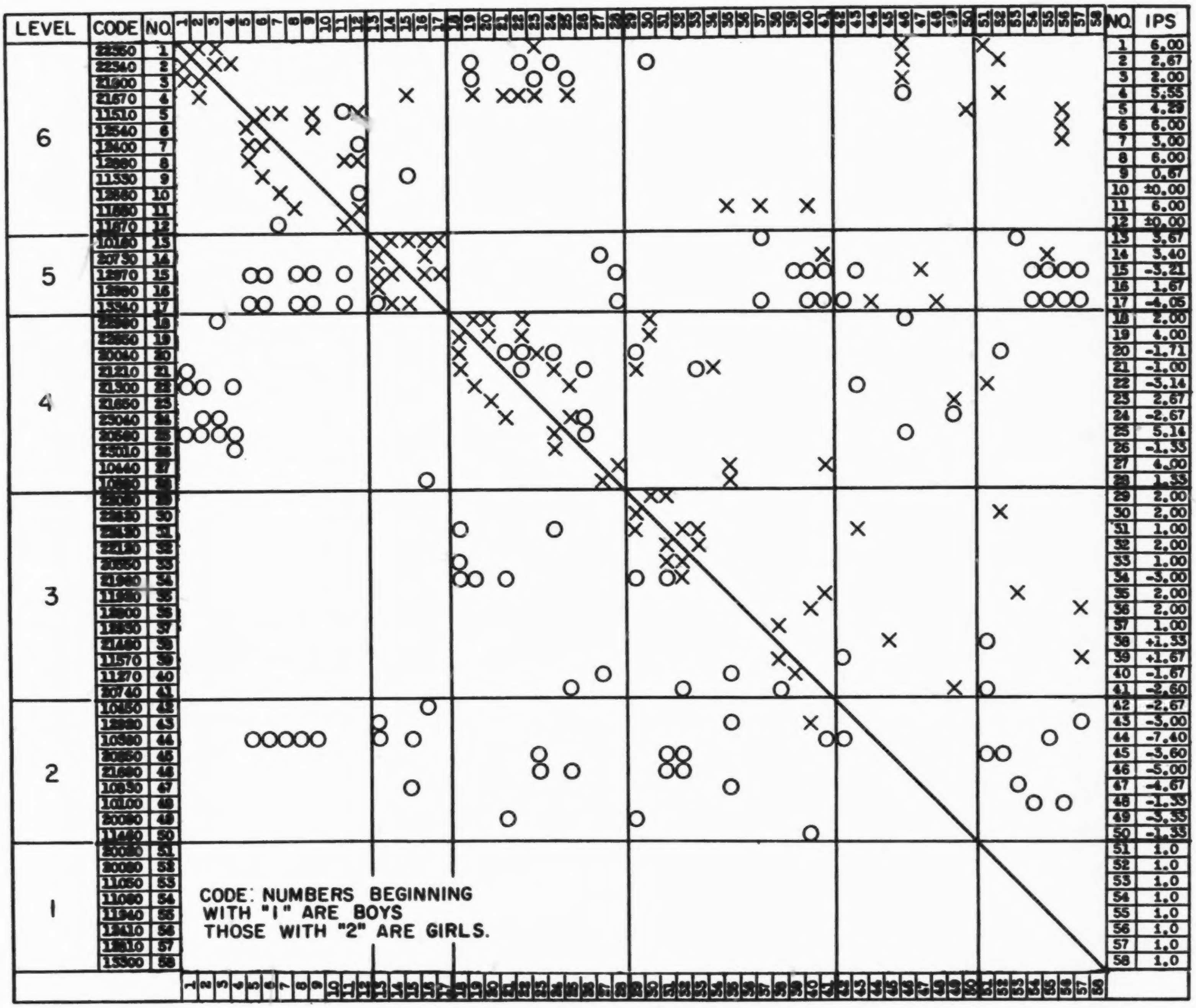


FIGURE J-2 SOCIOGRAPHIC MATRIX FOR GRADE VII (1957-58) IN ELEMENTARY SCHOOL Y, COMMUNITY B

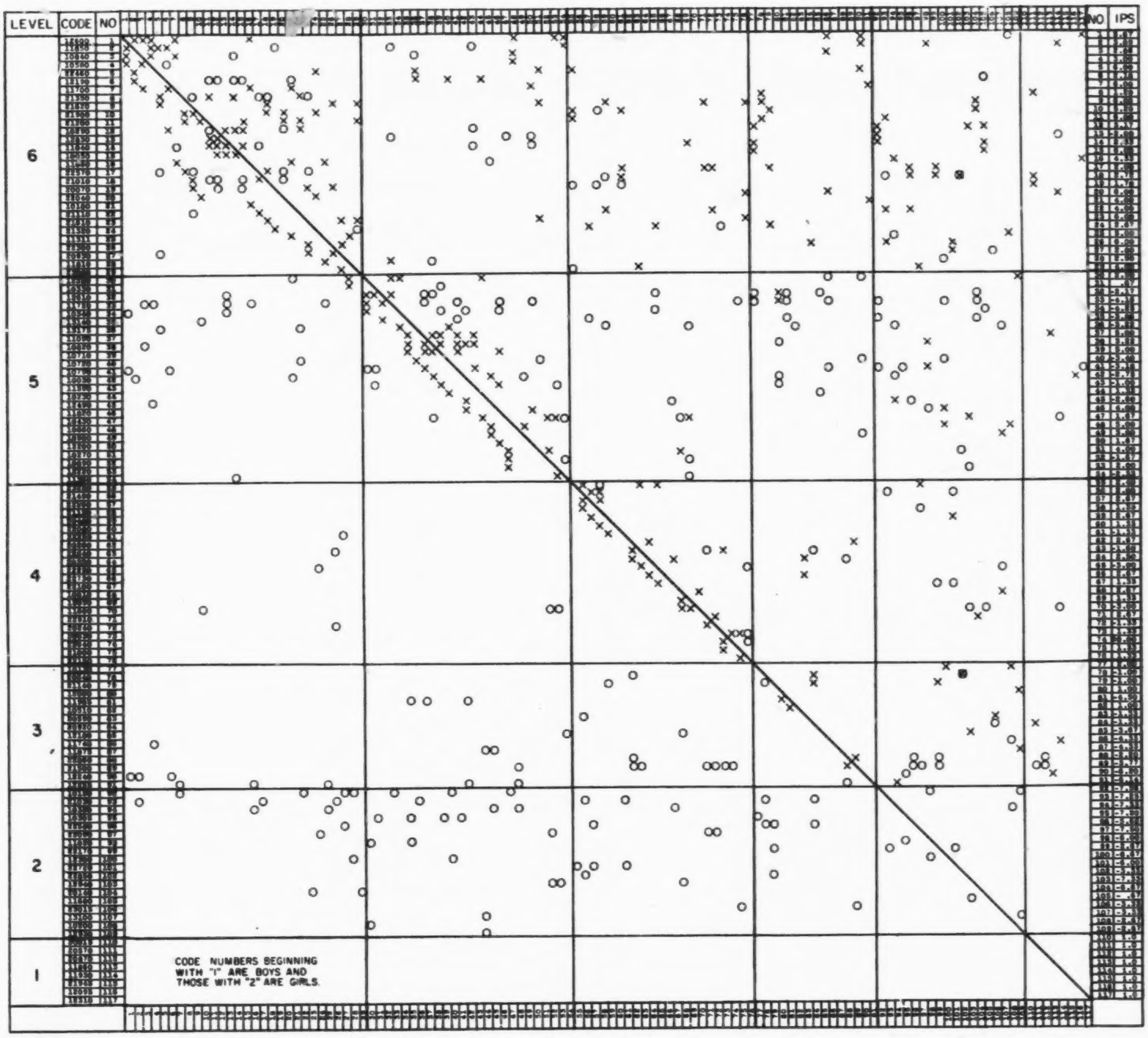


FIGURE J-3 SOCIOGRAPHIC MATRIX FOR GRADE VII (1957 - 58) IN ELEMENTARY SCHOOL Z, COMMUNITY B

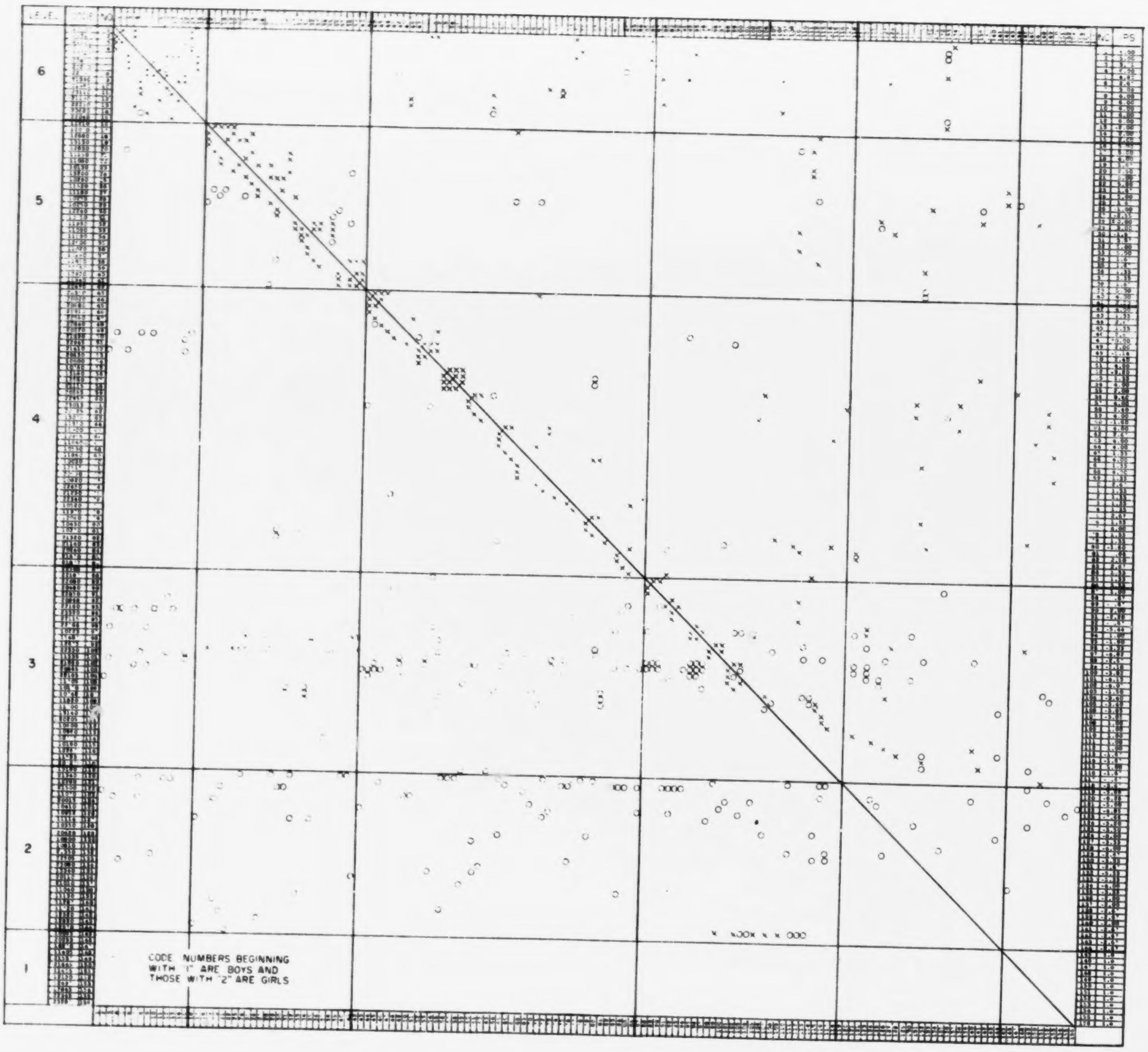


FIGURE J-4 SOCIOGRAPHIC MATRIX FOR GRADE VIII (FALL 1958-59) IN JUNIOR HIGH SCHOOL M, COMMUNITY B

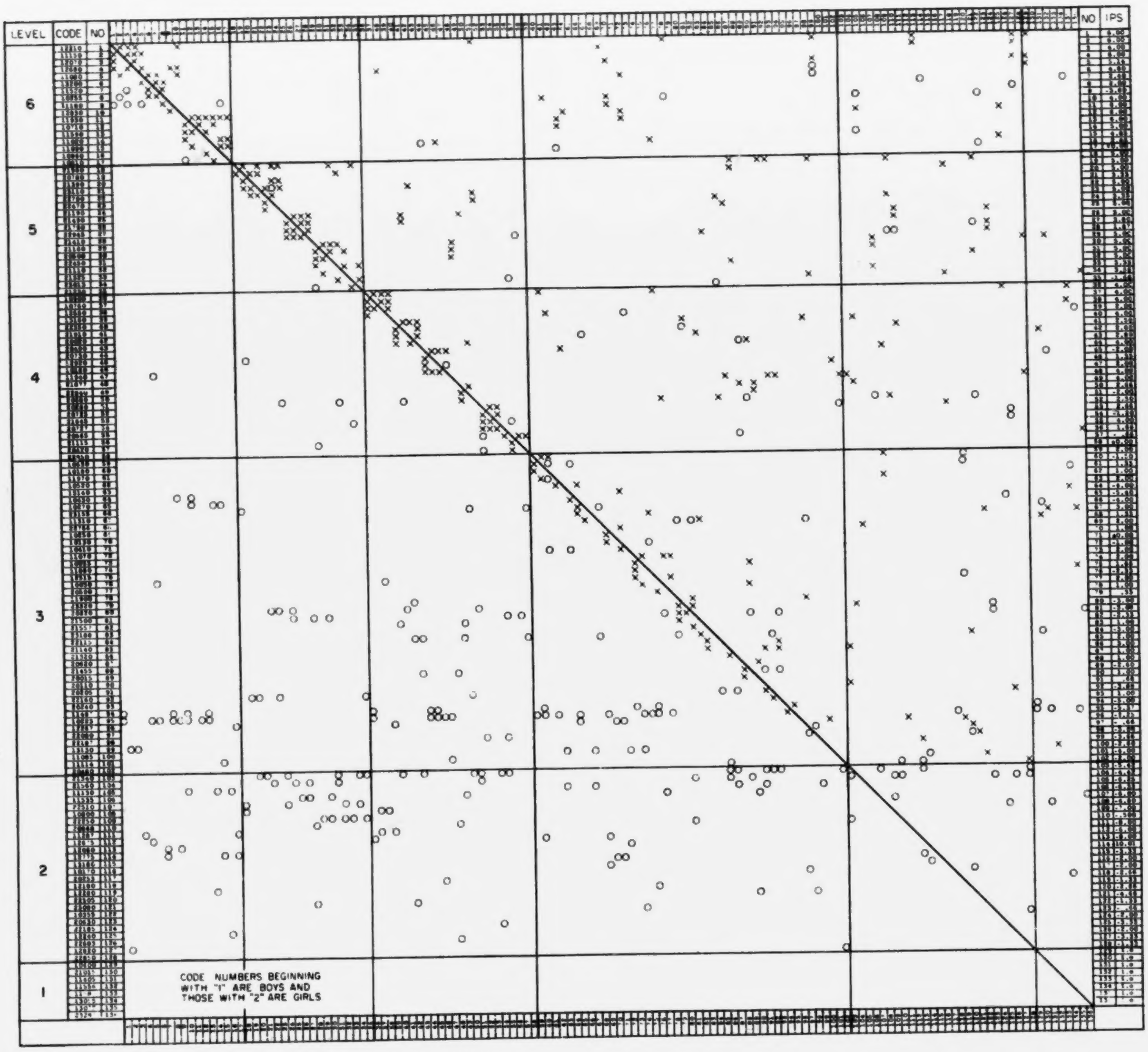


FIGURE J-5 SOCIOGRAPHIC MATRIX FOR GRADE VIII (SPRING 1958-59) IN JUNIOR HIGH SCHOOL M, COMMUNITY B

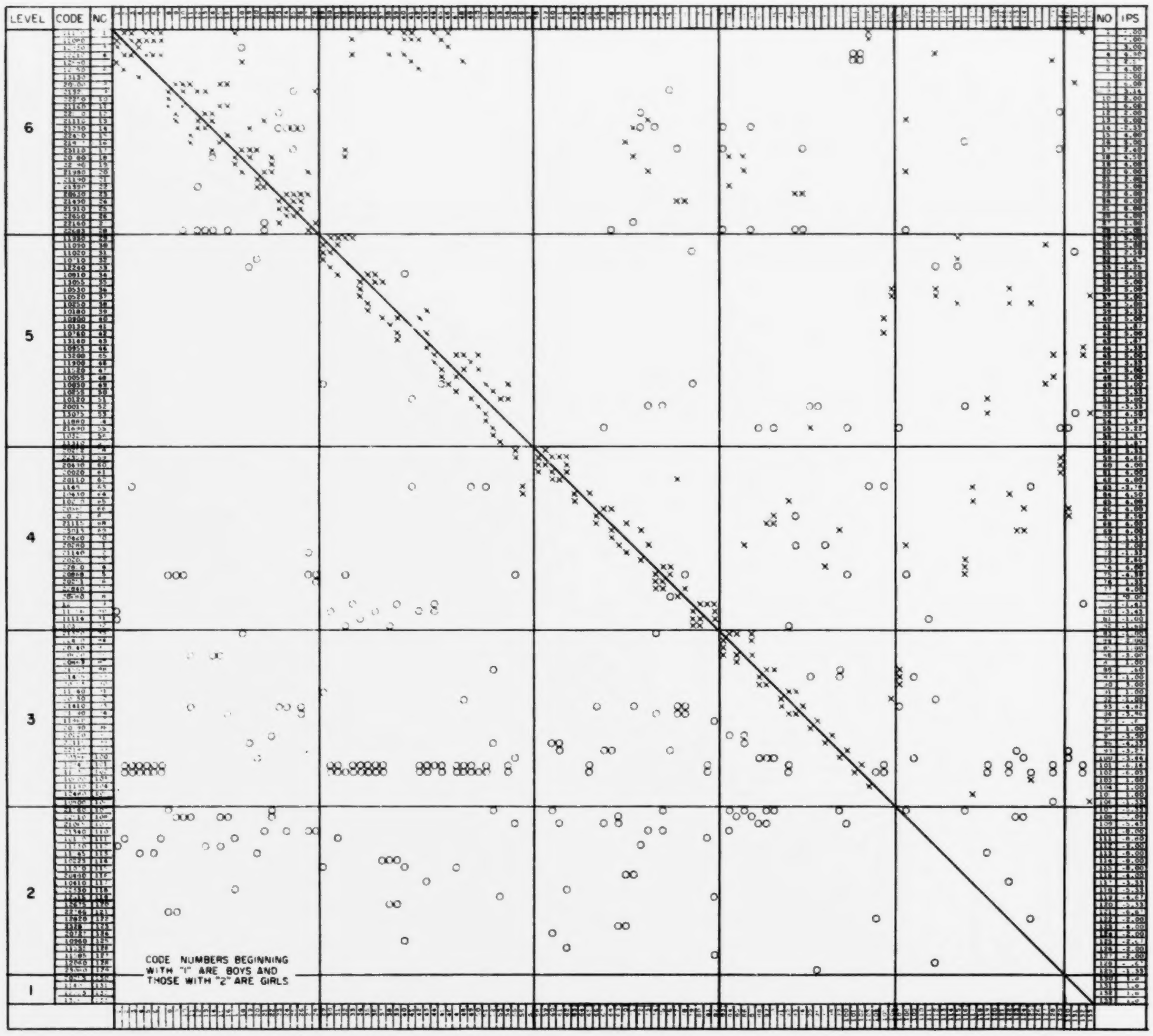


FIGURE J-6 SOCIOGRAPHIC MATRIX FOR GRADE IX (FALL 1959 - 60)
IN JUNIOR HIGH SCHOOL M, COMMUNITY B

TABLE 3.8

Sociographic Orders (line 1) and Indices of Peer Status (line 2) for HTRP Subjects appearing upon three Sociographs for Grade VII in Elementary schools (J-1, J-2, J-3), Grade VIII during Fall (J-4) and Spring (J-5) as well as Grade IX (J-6) in a Bandana Junior High School, 1957-60. (Code numbers for males begin with "1"; those for females begin with "2").

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
Total N	46	58	117	156	136	133
10030			42 -2.75	70 2.67	76 -2.35	49 1.00
10130			77 2.00	23 1.67	70 1.00	41 1.67
10160		13 3.67		37 3.33	46 1.33	
10170	30 1.00			106 -3.85	116 -2.20	111 -8.80
10180			21 4.00	115 1.00	60 -1.50	39 3.33
10223				97 -4.82	95 -5.37	114 -8.00
10250	11 6.00			29 3.00	69 2.00	38 5.00
10255	10 -3.00			28 ±0.0	8 2.00	50 3.33
10270			51 4.00	81 0.66	65 -5.40	65 4.00
10410				125 -3.50	71 1.00	117 -3.30
10430			47 1.67	80 -1.60	64 -4.00	64 4.50
10520				77 4.00	62 1.00	37 5.00

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
10530				68	59	36
				4.00	2.00	5.00
10600	43			112	129	103
	1.0			1.00	1.0	1.00
10710			39	31	12	32
			5.00	3.57	6.00	1.67
10760				55	37	42
				2.00	4.00	5.00
10800				130	108	106
				-3.33	-4.80	-1.33
10810			68	131	17	34
			2.67	-2.67	±0.00	2.50
10900				54	36	40
				4.00	4.00	5.00
10955				66	73	44
				4.00	2.00	3.33
10960	5			113	16	125
	5.00			-1.67	2.66	-2.67
11020			98	36	14	31
			-6.00	1.33	5.00	2.50
11070	34			123	72	115
	-5.40			-7.66	-1.00	-8.00
11080	4			22	5	2
	5.00			5.00	5.14	6.00
11090			37	33	15	30
			5.00	5.00	4.85	5.00
11114				127	101	81
				-3.33	-4.00	-1.00
11130	33			139	105	112
	-5.00			-2.67	-6.25	-9.00
11150	2			21	2	1
	4.67			5.00	6.00	6.00

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
11180	12			27	9	104
	-4.28			-2.55	-3.60	1.00
11310				64	67	57
				4.00	3.00	1.67
11405				148	131	131
				i.0	i.0	i.0
11487				98	94	93
				-2.67	-5.00	-4.82
11520	9			26	7	47
	-3.00			-1.00	2.40	5.00
11535				101	106	126
				-4.13	-6.33	-2.00
11590			43	34	13	
			-1.00	1.67	6.00	
11860			113	69	74	95
			i.0	1.33	2.00	-.67
11900	44			65	78	46
	i.0			1.33	1.00	3.33
11930			114	32	11	29
			i.0	5.00	6.00	5.00
11940		55		41	47	91
		i.0		2.20	2.00	1.00
12060				79	113	128
				1.33	-8.00	-.67
12070	7			17	3	
	2.00			5.00	4.00	
12180			85	152	118	
			-3.67	i.0	-2.66	
12210	3			16	1	4
	5.71			5.00	6.00	4.90
12240			90	30	125	33
			-6.20	-1.67	-3.33	-2.25

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
12280			30 2.50	121 -5.00	119 -1.33	
12515				71 1.33	75 1.66	119 -4.67
12550				57 4.00	38 4.00	6 4.00
12675				99 -5.18	112 -6.00	120 -5.33
12680	1 6.00			18 4.00	4 4.00	5 2.57
12775				114 -1.67	114 -10.01	79 -1.43
12820	45 i.0			143 -2.67	127 -3.33	122 -2.00
12830			13 -2.00	20 2.50	10 4.00	3 3.00
12920		43 -3.00		40 4.00	45 -2.00	
13075				63 4.00	135 i.0	53 4.50
13130	40 -7.20			19 1.67	99 -3.66	7 2.00
13140			35 -3.86	110 1.00	63 2.00	43 1.67
13200	8 2.40			24 5.00	6 4.80	45 5.00
20015			110 i.0	124 -5.20	89 -2.60	52 -3.33
20020		51 i.0		44 2.67	42 2.80	61 4.00
20110	27 2.00			136 -2.00	90 1.00	62 4.00

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
20205				111	91	73
				1.00	.66	2.66
20220				49	80	97
				-5.14	-3.00	-3.00
20240			72	84	93	85
			-1.33	1.33	1.00	1.00
20253				146	117	130
				i.0	-2.00	i.0
20280	14			7	51	71
	4.11			3.09	-2.00	2.00
20420				129	57	70
				-2.67	-.66	1.33
20480			59	90	102	116
			2.67	2.00	-2.00	-4.00
20490	25			42	43	60
	-2.00			4.00	2.80	4.00
20500				1	30	8
				6.00	5.00	6.00
20565				59	55	66
				4.00	4.00	4.00
20590			83	72	77	96
			-1.33	1.33	2.00	1.00
20620	31			14	87	86
	±0.00			2.00	1.00	-3.00
20630			73	53	123	23
			1.33	1.33	-.66	6.00
20680	24			45	50	78
	2.00			1.33	2.66	±0.00
20725				62	52	67
				2.67	2.50	2.50
20727				118	54	124
				-3.67	-1.20	-2.00

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
20730		14		39	44	92
		3.40		5.00	4.00	-1.00
20780	16			5	19	18
	5.00			4.80	5.00	4.50
20868				92	110	75
				-.67		-4.30
21110			22	3	32	13
			4.00	3.71	5.00	6.00
21115				58	56	68
				2.40	1.66	4.00
21140			79	83	85	72
			-1.00	2.67	2.00	-1.33
21160				4	29	11
				6.00	5.00	6.00
21190	17			12	24	21
	5.00			6.00	3.33	2.00
21230				75	35	14
				2.67	-1.66	-2.33
21320			24	82	86	83
			2.67	2.50	3.00	-1.00
21325				2	33	9
				5.00	3.33	3.14
21340	38			120	103	110
	-5.80			-6.26	-5.42	-8.00
21390	15			9	20	22
	5.00			6.00	5.00	3.00
21410				52	28	93
				-3.20	1.87	-4.82
21490			56	50	25	24
			2.00	2.40	5.00	6.00
21500			89	122	81	
			-3.77	-4.85	-3.08	

Subject ID No	J-1	J-2	J-3	J-4	J-5	J-6
21557				149	82	88
				i.0	-2.33	.60
21560	23			102	104	107
	-3.38			-4.07	-4.42	-5.33
21877				86	48	16
				3.33	4.00	5.00
21910	21			46	41	25
	2.00			2.67	2.50	6.00
21980			10	10	18	20
			5.20	6.00	5.00	6.00
22080			60	89	97	
			1.33	-.67	-.66	
22115				95	84	98
				-1.90	-3.00	-4.33
22160	42			93	92	27
	-4.67			-5.44	-3.88	1.00
22187				88	98	99
				.67	-3.00	-3.29
22250			61	13	109	10
			-1.33	-2.00	-7.00	2.00
22330	22			100	118	
	-2.72			-3.82	-2.66	
22350		1		43	40	59
		6.00		1.33	4.00	4.66
22450	32			74	31	15
	-1.67			1.33	5.00	4.00
22470	26			6	23	84
	3.00			2.67	5.00	2.00
22505				87	120	
				1.00	-2.66	
22510	29			133	107	108
	-3.00			-5.33	-6.00	-7.09

Subject ID No.	J-1	J-2	J-3	J-4	J-5	J-6
22766				96 -3.33	68 1.33	121 -6.67
22790	13 5.00			8 6.00	22 5.00	19 4.00
22840			63 -1.60	48 2.00	49 4.00	77 4.00
22850			102 -3.33	91 -2.20	128 -1.33	74 4.00
22945				51 4.00	27 3.80	
23013				61 4.00	34 3.66	69 4.00
23080				134 -4.00	121 -4.66	129 -1.33
23110	18 2.50			11 6.00	21 3.33	17 2.40
23287				156 1.0	136 1.0	123 -4.00
23320	46 1.0			94 1.00	79 .33	

a few of the tabulated subjects were not in the particular school during either grade VII or grade IX. Such cases are consequently identifiable by lack of entry in Table 3.8.

Some of the youngsters manifest a fairly stable peer status in terms of IPS scores. For example, subject No. 10130 (a male), had an IPS value of 2.00 in grade VII while in the school (Z) represented by sociograph J-3. He received two positive valuations and no negative ones. The fact that his nominators were not high status youngsters kept him from appearing at a level higher than 3 on the sociograph. His nominators were both boys: No. 12380 (sociographic rank 100), a highly rejected boy with IPS = -6.67, and No. 10200 (sociographic rank 100), a highly rejected boy, IPS = -2.67.

During the fall of grade VIII, the example subject's IPS changed very little from 2.00 to 1.67. Nevertheless, he appears at a higher level on the sociograph, level 5. Again he has two positive nominations, but they are not from boys who are completely rejected; the boys are accepted more than they are rejected. One of them is the same as the boy who was highly rejected the year before in grade VII, No. 12830, (sociographic rank 20); No. 12830 also choose our subject, No. 10130, creating a mutual choice situation. (He, No. 12830, becomes a good example of one who undergoes rather large changes from one year to another in terms of peer status as measured by the IPS.). The other positive nominator in J-4 is No. 10250 (sociographic rank 29). Our example subject also received a negative nomination from a high status girl, No. 20730 (sociographic rank 39).

In the spring of grade VIII, subject No. 10130's status index dropped a little more to 1.00. He received one positive nomination and no negative ones. He was chosen by No. 10250 (sociographic rank 69) as in the previous semester. But the boy who previously reciprocated choices did not return the compliment in the spring, whereas our subject continued to choose that boy (No. 12830, sociographic rank 10). The latter chose only boys from the top level group.

By grade IX, No. 10130's IPS still is relatively unchanged for the three years under study. He has been positively chosen by No. 10250 (sociographic rank 38), an old standby at this point in the adolescent society. Our subject no longer chose high status boy No. 12830 (and was not chosen by him), but he named three others of the very top level boys, perhaps revealing a real yearning to be a part of the most highly accepted group of youngsters.

Similar comparisons from one year to another year may be made by any interested reader. They would reinforce the third point made at the beginning of this chapter. Throughout the junior high school years; the emergent adolescent society and its peer cultures, as well as cliques, begin to assume their shape.

Summary and Conclusions

During their junior high school years, the boys and girls studied in the four communities underwent three kinds of influences making for change. First, while the majority of them were undergoing the transformation from being a child to appearing and living as an adolescent, the very communities in which they lived were in a period of startling transition into a new era. Second, the years of transformation were marked by (a) the loss of friends as families moved away and (b) the acquisition of new friends as families moved into the communities to take over industrial positions in a changed community. Third, throughout this period, the emergent adolescent society was taking shape. As proposed in the discussion of the catalytic model in Chapter 2 of this report, each boy and each girl was encountering the emergent adolescent society in which both members of the same sex and those of the other sex had to be considered.

Age-mate acceptance, avoidance, rejection, and/or isolation were encountered in a rather more complex setting than the peer culture of boys and girls during childhood. The increase of automation and the transformation of entire communities from dependence upon an agricultural society into competing in an industrial society brought into being a milieu in which young people found old expectancies and codes of conduct irrevocably altered. When a whole society changes as much and as rapidly as is indicated in our study of the four HTRP communities (and their entire state), then the catalytic model sometimes finds itself hard put to account for unforseen variations in certain predictor factors.

As was done for Table 3.8 and Subject No. 10130, individual analyses could be made to pinpoint the effects of membership in an emerging age-mate society of communities in transition, of families on the move, and of emerging value systems not as yet totally accounted for. At the present, one can only surmise the impact upon behavior and self-development. More needs to be done in statistical analysis of appropriate data gathered after developing more comprehensive, yet relevant, theoretical models. For the future, it becomes increasingly apparent that time and effort should be directed toward improving our understanding of the emergent adolescent personality and the composite adolescent society as its members struggle to incorporate into their own frame of reference the ever-changing and sometimes bewildering adult world.

Each boy and each girl has a history of being accepted, avoided, rejected, and/or isolated by age-mates both of the same sex and the other sex. Sometimes the pattern is stable; for other persons, the data in Table 3.8 indicate a great deal of instability or shifting age-mate acceptance during the junior high school years. Paralleled by a changing body, and probably a transformation of the concept of self ("Who I am"), these experiences probably are "catalytic" over the three-year period. This possibility is examined in the research summarized in the next chapter.

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CHAPTER IV

THE TRANSFORMATION OF PERSONALITY ATTRIBUTES[1]

This chapter explores the postulated dynamics of a social alienation syndrome observed among both girls and boys as they make the transition from preadolescence, through puberty, to early adolescence. The initial theory proposes that the syndrome occurs most frequently among males and females who have a set to accept authoritarian control not only for oneself (authoritarian submission) but also for others (authoritarian aggression). Within any given individual, the syndrome may be marked by the coexistence of tendencies toward mistrust, pessimism, loneliness, anxiety, and self-centeredness (i.e., a sense of being apart, or lacking in expected relationships). More specifically, the transformation into the alienation syndrome is postulated to be linked not only with a set to accept parental or parent-like controls (authoritarianism) but also a disposition to reject the behavior patterns of age-mates (nonconformity).

The transition from childhood to adolescence is marked by highly visible changes in bodily appearance together with shifts in ways of thinking, feeling, and acting upon the part of individuals concerned. The most obvious changes, of course, are marked by the "growth spurt" and the appearance of secondary sexual characteristics. Rapid increases in height and in weight and physiological changes, such as the beginning of menstruation for girls, do not necessarily occur at the same time. Developments at puberty often tend to be asynchronous (i.e., out of step with one another).

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[1] Based, in large part, upon the Ph.D. dissertation of Garrett R. Foster, Authoritarianism in Early Adolescence. Ann Arbor, Mich.: University Microflims, 1963, (Foster, 1963). Dr. Foster (who now is at Florida State University) designed and carried out the research for his dissertation while serving as a research associate in the Laboratory of Human Behavior and as an academic assistant in the Department of Educational Psychology at The University of Texas.

The physical and physiological changes which occur at puberty precipitate shifts in body image (i.e., the concept of one's body). Each boy and each girl soon acquires the expectation that one has to become, in some ways, a new person capable of new roles, or ways of behaving, in given situations. Consequently, with puberty, each boy and girl has to acquire a fresh concept of self (i.e., "Who I am"). Sherif and Cantril (1947) referred to these changes in concept of self as "re-formation of the ego" in early adolescence. As yet, little has been done to untangle the pattern of changes in personality attributes initiated at pubescence and to demonstrate their nature. Some of the variables have been identified in Peck & Havighurst (1960).

The data gathered upon changes in personality attributes through time in the longitudinal Human Talent Research Program (HTRP) probably fulfill essential requirements of a validly interpretable natural experiment as set forth by Donald Campbell (in Harris, 1963, pp. 212-244). Although precise developmental data could not be obtained, there is no doubt that among a majority of the boys and girls studied, pubescent changes were underway sometime between their responses to instruments in grade seven (1957-58) and in grade nine (1959-60). The fact that, in general, anatomical and physiological changes usually take place at an earlier age in females than in males can be taken into account in the analyses of data and interpretation of findings. For convenience, then, grade seven responses are considered preadolescent (PA) and those in grade nine as early adolescent (EA).

Although the original formulation of the dynamics of change did not turn out to be precisely accurate either for boys or for girls, the theory-building and hypothesis-testing yielded valuable insights. The basic model set forth in Chapter II provided a general theory of behavior from which to begin theory construction. Furthermore, the catalytic model developed from it permitted representation of change in terms of variables acting upon one another. After tests of hypotheses, the significant relations among variables revealed by analyses of data could be plotted graphically. Consequently the detailed statistical analyses, employing very powerful but not widely-used multiple-regression procedures, have been set apart in a statistical appendix to this chapter (pp. 4-42 to 4-73, then references).

Authoritarianism and the Alienation Syndrome

A wealth of literature has accumulated upon the topic of authoritarianism since the publication of The Authoritarian Personality (Adorno et al., 1950). Nevertheless, there is an extensive gap, both in theory and in research, between the manifestation of authoritarianism in adulthood and its antecedents in earlier years. Upon looking through summaries of the literature (e.g., Christie & Cook, 1958), as well as relevant chapters in the Annual Review of Psychology, one becomes aware that relatively little has been done to depict developmental aspects of the authoritarian personality in childhood or adolescent years. Roadblocks may have been put in the way by preoccupation with methodology, particularly the factorial content and the response sets attributed to the F-scale, beginning with the "studies" edited by Christie and Jahoda (1954).

Fortunately, members of the research team had participated in laying the ground work for the Texas Cooperative Youth Study recently reported by Moore & Holtzman (1965). Consequently, a less factorially complex scale, CYS Authoritarian Discipline, was employed in the HTRP studies and techniques were developed to evaluate response sets (Liberty, 1962).

Authoritarian Discipline (Moore & Holtzman, 1965, pp. 27-28). - Postulated to be primarily a measure of authoritarian submission

> (e.g., "A person my age should take the school subjects which his parents decide would be best for him"; "Children who always obey grow up to be the best adults") and authoritarian aggression (e.g., "Children should always be punished for being bad"; "Children need some of the natural meanness taken out of them").

The idea that authoritarianism as an element of personality might be linked developmentally with other variables in a complex manner arose out of the study of factor variables beginning in grade seven (McGuire, 1961a). Then, in the ninth grade, several kinds of personality instruments and attitude scales yielded a "factor in persons" common to both sexes in which the scale for authoritarianism was one indicator (McGuire, 1962 , p. 32).

> Alienation Syndrome. - Mistrust, pessimism, loneliness, resentment, anxiety, and self-centeredness are revealed in responses to self-report instruments. The most effective combination of scales for assigning factor weights are those wherein the boy or girl favors statements such as "strict discipline develops a fine character" (Authoritarian Discipline), "teenagers gossip too much about one another" (Criticism of Youth, see Moore & Holtzman, 1965, p. 30), and "when you get right down to it, no one is going to care much what is going to happen to you" (Negative Orientation to Society, Ibid., pp. 26-27).

The term was borrowed from Davids who first advanced psychological evidence of a syndrome of "alienation" among young men of college age (1955a, 1955b). Sociologically, of course, the concept has had a long history. From the point of view of the actor, "alienation" has been used to convey a number of ideas about expectations and reward value; namely, powerlessness, meaninglessness, normlessness, isolation, and self-estrangement or inability of a person to find self-rewarding activities that engage him (Seeman, 1959).

An analagous factor variable originally had been labeled Authoritarian Socialization among seventh-grade subjects when more sophisticated computer techniques[2] were adopted for the reworking of preliminary analyses reported by McGuire (1961a, pp. 51-52). The correlation between seventh-grade Authoritarian Socialization and ninth-grade Alienation Syndrome was .335, leaving nearly 90 per cent of the common variance unexplained. The sets of predictor measures which defined the pair of factor variables, their factor loadings, and their regression weights all varied from the seventh-grade to the ninth-grade years.

The variability in the preadolescent (PA) and early adolescent (EA) analogous "factors in persons" posed an important question to be answered. What were the dynamics of the emergence of authoritarianism and the seemingly concomitant symptoms of an alienation syndrome among a substantial number of early adolescents? Attention was directed to formulating a developmental theory which would yield specific hypotheses to be tested (see Tables 5-14, p. 5-43, and 5-18, p. 5-54).

Dynamics of an Alienation Syndrome Among Authoritarian Adolescents

A number of investigators have confirmed the early contention (Adorno et al., 1950) that authoritarian parents demand conventional, adult behavior of their children (for example, Block, 1955; Hart, 1957; Zuckerman & Oltean, 1959). These parents tend to be highly restrictive, domineering, and punitive in their child-rearing practices. They are unlikely to encourage, or even tolerate, attempts by their offspring to establish independence by substituting the value systems and behavior norms of age-mates in place of standards set by parents. Thus parental expectations and parental restrictions would be expected to inhibit the young person's attempts to conform to expectations within the peer culture.

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[2] Replacement of the original IBM 650 computer by a CDC 1620 with a much greater memory or storage capacity permitted the analyses to begin with the raw data for all variables judged to be pertinent to a given study. As reported by Jennings (1964), a number of subroutines were developed so that data analyses for any study could be completed in one "pass" through the computer. Thus, it no longer was necessary to begin with stanine values and actually select a limited number of variables as indicators for which to compute regression weights in order to derive factor scores for each subject. Factor scores for each S were computed using "modal weights" for **every** variable (e.g., see Tables 5.12 and 5.13 on pp. 5-40 and 5-41 respectively in Chapter V).

Equally important are certain factors in the development of the authoritarian personality which suggest that the authoritarian adolescent is somewhat predisposed to reject the peer culture. Theoretically, the restricted and harshly punitive child-rearing practices of authoritarian parents result in a personality structure characterized by (1) a weak ego in which various defensive mechanisms often suppress problem-solving capacities, and (2) a rigid superego which is not adequately internalized but remains dependent on an external source of authority (Sanford, 1956).

Consequently, an authoritarian adolescent may lack the ego strength to resolve inevitable conflicts between parental and peer values. Being excessively dependent on the external system of authority to which he is accustomed, he is likely to continue conforming to parental values in the face of increasing peer group demands for conforming to age-mate standards during early adolescence. Recent studies indicate that persons characterized by a non-internalized superego, sometimes referred to as authoritarian superego (Sanford, 1956), can be differentiated on a bipolar rigidity-flexibility scale (Mitchell & Pierce-Jones, 1960; Pierce-Jones, Mitchell, & King, 1962; Wilson, 1963). Authoritarians characterized by a flexible non-internalized superego appear to accept readily the authority of those in whose presence they currently find themselves. On the other hand, those with rigid non-internalized, non-integrated superegos tend to conform consistently to one source of external authority regardless of the social group in which they are placed. Consequently, among so-called authoritarian adolescents, one would anticipate some who would conform, perhaps excessively, to the norms of adolescent behavior while in the presence of age-mates.

Theoretically, young people who rigidly conform to parental sources of external control should be the ones who have failed to conform to the norms of a peer culture. Being nonconformists in the emerging adolescent society, they would encounter increased avoidance, rejection, or isolation among age-mates during early adolescence. Prior to adolescence, however, excessive submissiveness to parental authority is not necessarily accompanied by social difficulties. This statement is based upon the premise that relatively few preadolescent boys and girls are seriously challenging adult-imposed standards.

Consequences of Rigid and Flexible Superegos

Pubescence, however, seems to be the biosocial catalyst for the adolescent's intensified drive for emancipation. Consequently, young people tend to disvalue parental standards in favor of peer standards. Data from a number of studies lead to the inference that authoritarian boys and girls who persist in rigid conformity to adult-imposed standards during early adolescent years are apt to be increasingly rejected by peers in the emerging adolescent society (Tyron, 1939; Clark & McGuire, 1952; Coleman, 1960; Hindsman, 1960). At this time, age-mates are making more and more demands for conformity to a subculture of ever-increasing complexity. Among these authoritarian youth, then, resentment of adult domination and, more importantly, resentment of peer rejection could be the bases of the transformation of earlier social attitudes into an alienation syndrome during early adolescence.

On the other hand, boys and girls characterized by a flexible non-internalized superego just prior to the emergence of the adolescent society probably would (a) have little difficulty in conforming to the values and expectations of the peer groups, (b) experience little or no social rejection by the peer group, and, consequently, (c) not manifest the alienation syndrome.

In summary, then, a theory had to be designed and research carried out to answer the following questions concerning the transformation of attitudes into an alienation syndrome during early adolescence:

(1) Is conformity or lack of conformity to the peer group related to authoritarianism in adolescents?

(2) Is peer group rejection related to authoritarianism in adolescents?

(3) Is the manifestation of an alienation syndrome related to authoritarianism in adolescents?

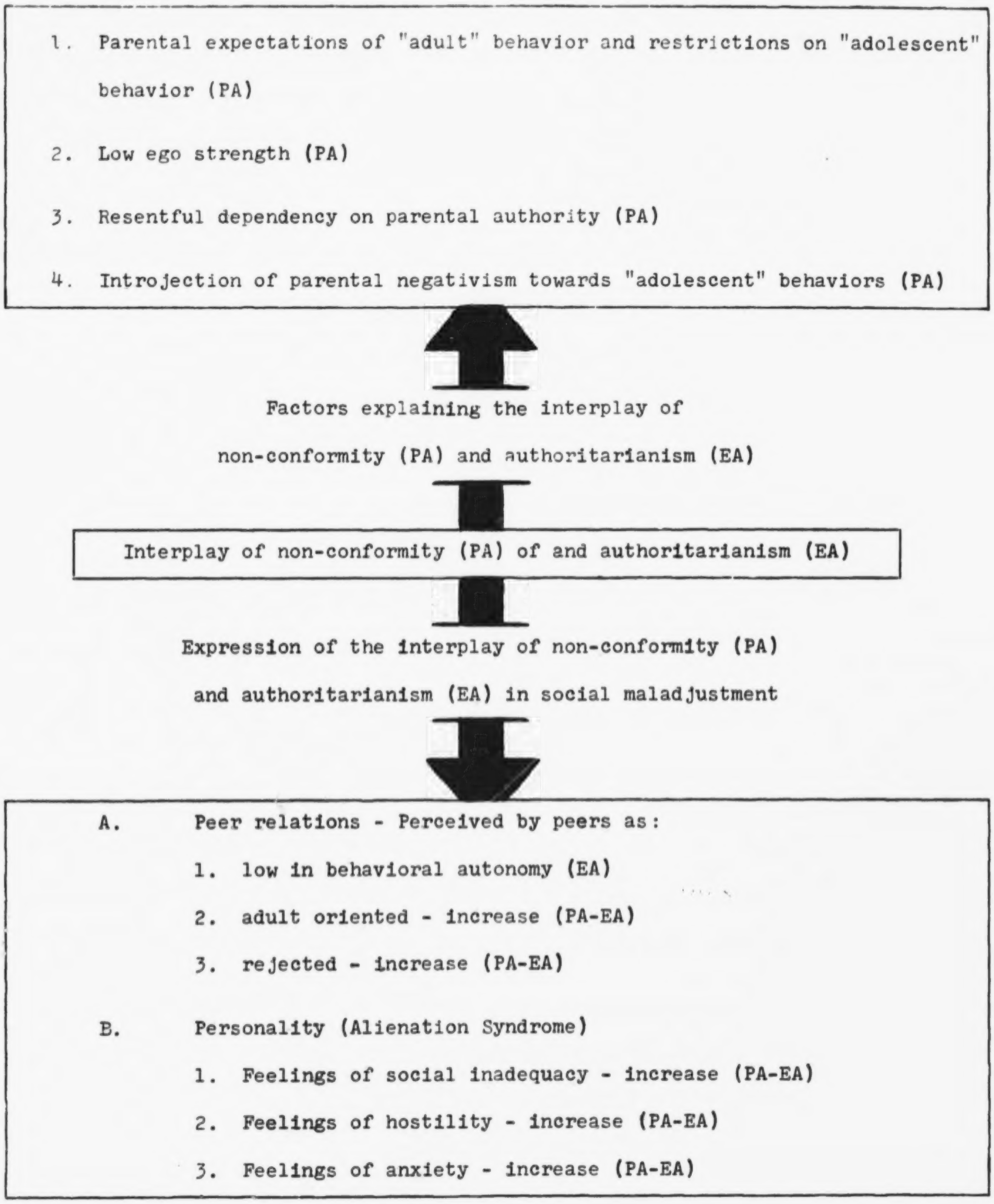
(4) Does the degree of peer group rejection of authoritarian adolescents depend upon the extent to which authoritarian adolescents conform or fail to conform to age-mate expectations?

From Theory to Testable Hypotheses

The theory developed in the preceding discussion of authoritarianism and the alienation syndrome is presented schematically in Fig. 4.01. With regard to the authoritarian personality during the early adolescent years, the central postulates are two in number:

(1) a social alienation syndrome is most likely to appear among early adolescents who accept authoritarian control not only for themselves (authoritarian submission) but also for other persons (authoritarian aggression);

(2) the syndrome is in part a function of failure to conform to a peer culture during the transition from preadolescent to early adolescent years.



1. Parental expectations of "adult" behavior and restrictions on "adolescent" behavior (PA)
2. Low ego strength (PA)
3. Resentful dependency on parental authority (PA)
4. Introjection of parental negativism towards "adolescent" behaviors (PA)

Factors explaining the interplay of non-conformity (PA) and authoritarianism (EA)

Interplay of non-conformity (PA) of and authoritarianism (EA)

Expression of the interplay of non-conformity (PA) and authoritarianism (EA) in social maladjustment

A. Peer relations - Perceived by peers as:
   1. low in behavioral autonomy (EA)
   2. adult oriented - increase (PA-EA)
   3. rejected - increase (PA-EA)

B. Personality (Alienation Syndrome)
   1. Feelings of social inadequacy - increase (PA-EA)
   2. Feelings of hostility - increase (PA-EA)
   3. Feelings of anxiety - increase (PA-EA)

Figure 4.01. Non-Conformity as a Pre-Condition of an Alienation Syndrome in Authoritarian Adolescents (Theory)

Further, nonconformity to a peer culture probably is a function of (i) parental restrictiveness, (ii) low ego strength, (iii) resentful dependency upon authority figures, and (iv) incorporation of the negative attitudes of parents toward sub-adult or "juvenile" behavior.

From the theory presented in Fig. 4.01, working hypotheses can be formulated. As shown schematically in Fig. 4.02, the working hypotheses are set forth in terms of linkages among a series of scales and other measures of behavior, i.e., operational counterparts of the theory and its postulated relations among variables.

The basic model guiding the research, explained fully in Chapter II,

$$B_a = f(P_a, E_{a\cdot b}, R_{b\cdot a}), S_a, G_a, C_{ab}$$

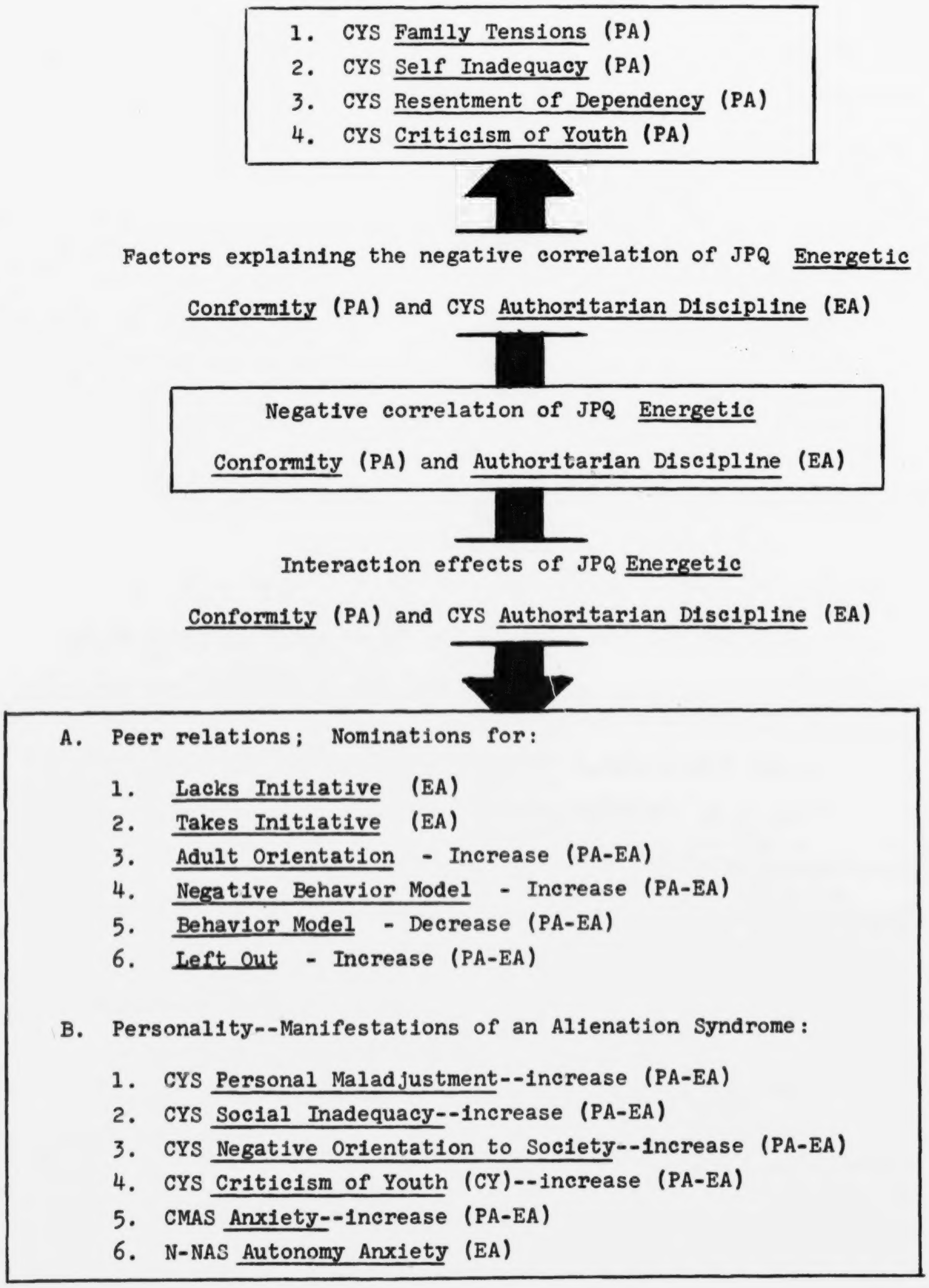
can be reorganized to reflect the specific research design for studying relations among personality attributes as they change over time. The resultant model is

$$B_a = f\,[(E_{a\cdot b}, R_{b\cdot a}), P_a, C_{ab}]\, S_a$$

where

B_a = measured increase in responses of individuals from grade seven (PA) to grade nine (EA) in the expression of social attitudes and related attributes which constitute a social alienation syndrome:

B_{a1} = CYS Social Inadequacy (Moore & Holtzman, 1965, pp. 37-38). - Postulated to measure an interpersonal competence in terms of a lack of ability to interpret the intentions of others -- an inability to form person-to-person relationships (e.g., "I have trouble making friends easily" and "I am afraid people will laugh at me because I'm not sure how to act," as well as "I don't feel sure how to act on a date").



1. CYS Family Tensions (PA)
2. CYS Self Inadequacy (PA)
3. CYS Resentment of Dependency (PA)
4. CYS Criticism of Youth (PA)

Factors explaining the negative correlation of JPQ Energetic Conformity (PA) and CYS Authoritarian Discipline (EA)

Negative correlation of JPQ Energetic Conformity (PA) and Authoritarian Discipline (EA)

Interaction effects of JPQ Energetic Conformity (PA) and CYS Authoritarian Discipline (EA)

A. Peer relations; Nominations for:

1. Lacks Initiative (EA)
2. Takes Initiative (EA)
3. Adult Orientation - Increase (PA-EA)
4. Negative Behavior Model - Increase (PA-EA)
5. Behavior Model - Decrease (PA-EA)
6. Left Out - Increase (PA-EA)

B. Personality--Manifestations of an Alienation Syndrome:

1. CYS Personal Maladjustment--increase (PA-EA)
2. CYS Social Inadequacy--increase (PA-EA)
3. CYS Negative Orientation to Society--increase (PA-EA)
4. CYS Criticism of Youth (CY)--increase (PA-EA)
5. CMAS Anxiety--increase (PA-EA)
6. N-NAS Autonomy Anxiety (EA)

Figure 4.02. Non-Conformity as a Pre-Condition of an Alienation Syndrome in Authoritarian Adolescents (Operations)

B_{a2} = CYS Criticism of Youth (Ibid., pp. 30-31). - Postulated to be a measure of a set to find fault with one's age-mates and criticize their behavior (e.g., "Sillyness is one of the worst faults of most teenagers" and "Teenagers gossip too much about each other").

B_{a3} = CYS Negative Orientation to Society (Ibid., pp. 26-27). - Postulated to be a measure of generalized hostility toward society (e.g., "A person should insist on his own rights no matter what the cost" and "If you don't watch yourself, people will take advantage of you").

B_{a4} = CMAS Anxiety (modified from Casteneda et al., 1956). - Postulated to be a measure of underlying anxiety or the "motive to avoid failure," especially in ego-involving, threatening, or stressful situations (e.g., "My hands feel sweaty," "I have trouble making up my mind," and "I worry about what my parents will say to me").

B_{a5} = CYS Personal Maladjustment (Moore & Holtzman, 1965, pp. 35-37). - Postulated to be a measure of ineffective or borderline behavior arising out of misperception of the self and the object world, inability to cope with pressures imposed by others, and/or lack of a sense of identity (e.g., "Sometimes I feel things are not real" and "I get mad and do things I shouldn't do when I can't have my way").

$E_{a \cdot b}$ = elements of the adolescent personality:

$E_{a \cdot b1}$ = CYS Authoritarian Discipline (described on pp. 4-3, 4-4, and A-14).

$E_{a \cdot b2}$ = JPQ Energetic Conformity (Cattell & Beloff, 1953). - Postulated to be a measure of whether the respondent tends to be the lively conforming mixer among age-mates or nonconforming (e.g., "Do you find it hard to talk to the captain of a team or some important boy or girl in school?").

$R_{b \cdot a}$ = Peer perceptions of and responses to the behavior of the boy or girl in an emerging age-mate society:

$R_{b \cdot a1}$ = Adult Orientation. - Peer nominations for "Name three persons about your own age who always depend upon their parents or older people for advice. They look up to older persons for approval."

$R_{b \cdot a2}$ = Has Initiative. - "Name three persons who see things to do and go ahead and do them on their own initiative."

$R_{b \cdot a3}$ = Lacks Initiative. - "Name three persons who have to be told everything to do and how to do it. They seldom seem to be able to do anything on their own."

$R_{b \cdot a4}$ = Behavior Model. - "Name three persons you would like to be like."

$R_{b \cdot a5}$ = Negative Behavior Model. - "Name three persons you would not like to be like."

$R_{b \cdot a6}$ = Left Out (or Isolated). -"Name three persons about your age who are left out of things on purpose. They make other people feel uncomfortable."

P_a = Cognitive potential as measured by the California Test of Mental Maturity (CTMM).

C_{ab} = The general context in which the behavior occurs over time and the specific contexts in which the behavior is measured:

C_{ab1} = ISS Family Status (McGuire & White, 1955). - Postulated to be an indicator of variations in learning experiences as well as expectations held for the individual by school people.

C_{ab2} = Agreement Response Set (ARS as scored by Liberty, 1962).

C_{ab3} = Extreme Response Set (ERS). - A score derived from patterns of responses to the Brown-Holtzman SSHA Scholastic Motivation Scale in a manner developed by Liberty (1962).

S_a = Sex classification of the individual.

The elements of the second formula are identical to those in the first equation with the exception of generation (G_a) which has been omitted. Age-grade or generation is a constant in the longitudinal study of the HTRP population. The sex-role variable, S_a, has been placed outside the square brackets to indicate that separate analyses were required for boys and for girls.

Statistical Analyses

The working hypotheses presented schematically in Fig. 4.02 were tested by employing multiple-regression procedures. The working hypotheses could be tested because appropriate repeated measures were obtained for a sample of 288 boys and 288 girls during their preadolescent (grade VII) and early adolescent (grade IX) years. The population was restricted to "Anglo-American" males and females. Consequently, the findings do not necessarily apply to Negro-American (most numerous in Ashton and Bandana) or to Latin-American boys and girls (most numerous in Centerville and Duneside).

The method and the resultant tables have been set apart in a separate Statistical Appendix to this chapter. Results also are depicted in the body of the chapter. This is done by using figures which present plots of significant linear and curvilinear relations among variables for boys and for girls. The catalytic model set forth in Chapter II, used to reflect changes over time when variables influence one another, also has been employed in the analyses of data. These analyses required multiple-regression models with an interaction term (i.e., products of values for two measures). The plotted result usually is a pair of regression lines (linear or curvilinear) relating two variables -- one line is for subjects in the upper third (stanines 7-9), the other line is for subjects in lower third (stanines 1-3) in terms of a third "catalytic" or "moderator" variable.

In the analyses of developmental changes generalized from grade seven (PA) to grade nine (EA), a number of elements of the preadolescent personality ($E_{a \cdot b}$) were taken into account by scales indicated in Fig. 4.02:

(1) CYS Family Tension (Moore & Holtzman, 1965, pp. 33-35). - Postulated to be a measure of responses to parental restrictions and/or manipulative controls, culminating in resentment and hostility (e.g., "Everyone in my family seems to be against me" and "My parents often object to the kind of boys and girls I go around with").

(2) CYS Self Inadequacy (Ibid., pp. 31-32). - Postulated to be a measure of a tendency to defend against, rather than cope with, environmental pressures and threatening situations (e.g., "I dislike eating away from home for fear I'll do the wrong thing" and "I just never seem to get anything done").

(3) CYS Resentment of Dependency (Ibid., pp. 41-42). - Postulated to be a measure of resentment engendered by dependence upon external parental control (e.g., "My parents treat me as if I do not know right from wrong" and "My parents never really trust me").

(4) CYS Criticism of Youth (Ibid., pp. 30). - Postulated to be a measure of a set to find fault with one's age-mates and to criticize their behavior (e.g., "Sillyness is one of the worst faults of most teenagers" and "Teenagers gossip too much about each other").

Relations Among Variables During Developmental Changes

Each variable has been defined operationally in the preceding section. As stated earlier, the hypotheses to be tested are implicit in Fig. 4.02. They are stated more explicitly in the titles of and the regression models constructed for the tables in the Statistical Appendix which follows this chapter (pp. 4-42 ff.).

Emergence of an Alienation Syndrome

Statistical analyses of the data consistently support the hypothesized transformation of attitudes into an alienation syndrome among authoritarian adolescents. The evidence from the relevant tables is gathered together here and plotted to show probable relations among variables as clearly as possible. The figures do not follow the order of the tables in the Statistical Appendix since results are presented in a more convenient order.

Criticism of Age-Mates. - The strongest element in the alienation syndrome is the marked increase in set to find fault with age-mates reflected in seventh- and ninth-grade responses to CYS Criticism of Youth. Results of the statistical analyses (Table 4.10) are plotted in Fig. 4.03. Among both sexes, all else being equal, increases in Criticism of Youth from preadolescence to early adolescence (CY9-CY7) parallel measured Authoritarian Discipline (A9) in grade nine. Slopes of the two lines indicate that the rate of change in CY scores in relation to A9 is greater for girls than for boys.

Alienation from Society. - Generalized hostility toward society also increases with any increment in early adolescent authoritarianism. Results (Table 4.11) of analyses of increases in Negative Orientation to Society (NOS9-NOS7) are plotted in relation to post-pubescent Authoritarian Discipline (A9) in Fig. 4.04. Slopes of the two regression lines indicate that the relation is stronger for girls than for boys.

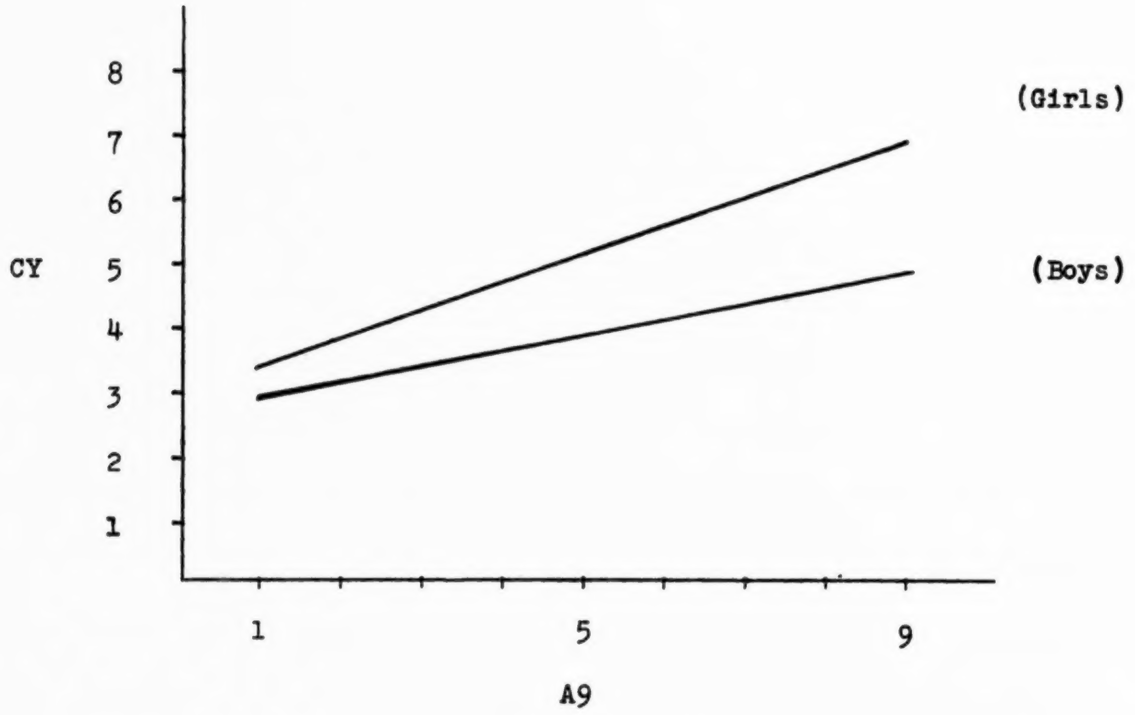


Figure 4.03. Increase in Criticism of Youth as a Function of early adolescent Authoritarian Discipline. (Table 4.10, p. 4-67)

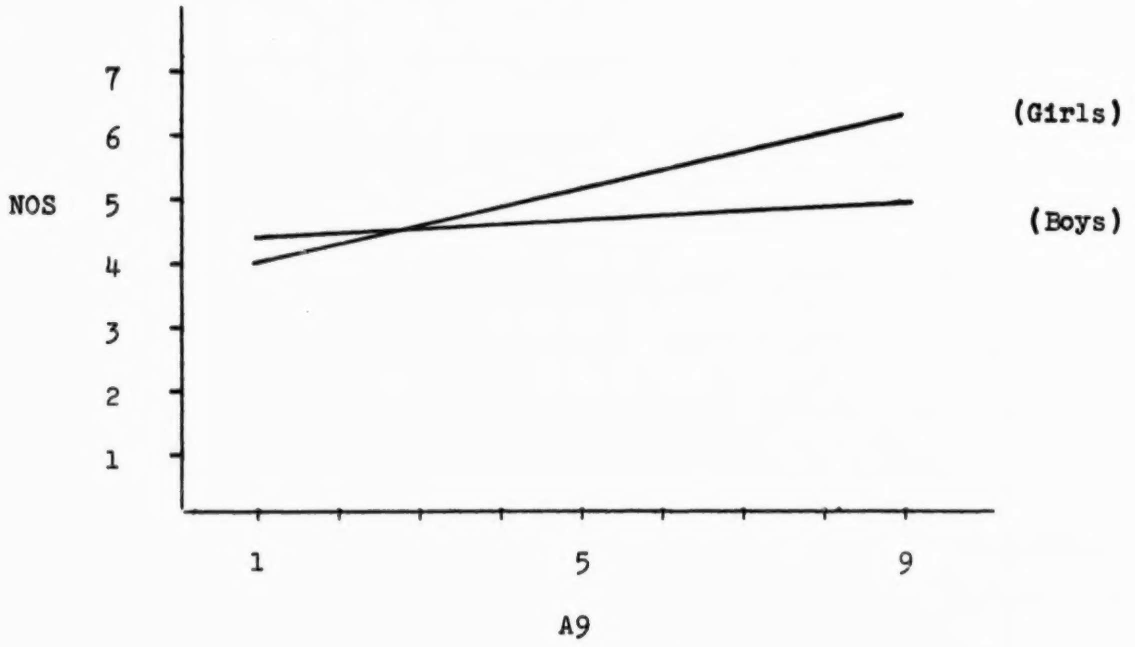


Figure 4.04. Increase in Negative Orientation to Society as a function of early adolescent Authoritarian Discipline. (Table 4.11, p. 4-69)

Symptoms of Anxiety. - Reasoning from the premise that he or she fails to take advantage of social mechanisms provided by the emerging age-mate society to attain a greater degree of relative independence from parental authority, one would infer that the authoritarian adolescent is apt to develop feelings of anxiety, or fear of failure, as part of an alienation syndrome. Statistical analysis (Table 4.12) clearly shows that, for both sexes, increases in anxiety occur along with greater adolescent authoritarianism. The linear relation between CMAS Anxiety and early adolescent Authoritarian Discipline is plotted in Fig. 4.05 for boys and girls.

Although the plotted regression lines do not convey the strength of the relation between anxiety and authoritarianism for either sex, the statistical significance was found to be at the .001 level of confidence for boys and the .005 level for girls. Apparently some of the girls' anxiety arises out of self doubts regarding autonomy, or taking responsibility for one's own actions. This inference is supported by an analysis of increases in Autonomy Anxiety (Table 4.13, p. 4-71). Although not shown, the plotted relation to early adolescent Authoritarian Discipline for girls would be quite similar to the regression line for boys in Fig. 4.05.

Interpersonal Competence. - Increased feelings of social inadequacy were postulated to accompany the increments in hostility toward age-mates and general cynicism toward society. These three components of a social alienation syndrome were expected to be the most direct effects of age-mate rejection experienced by the authoritarian adolescent who fails to assimilate or to conform to a peer culture. Statistical analysis (Table 4.9) demonstrated a curvilinear relation between increases in Social Inadequacy and early adolescent Authoritarian Discipline for girls but not for boys. As shown in Fig. 4.06, girls with scores at either extreme of the scale reflecting authoritarianism in the ninth grade (A9) tended to have higher values on the SI scale administered in that grade than did girls in the middle range. The multiple regression

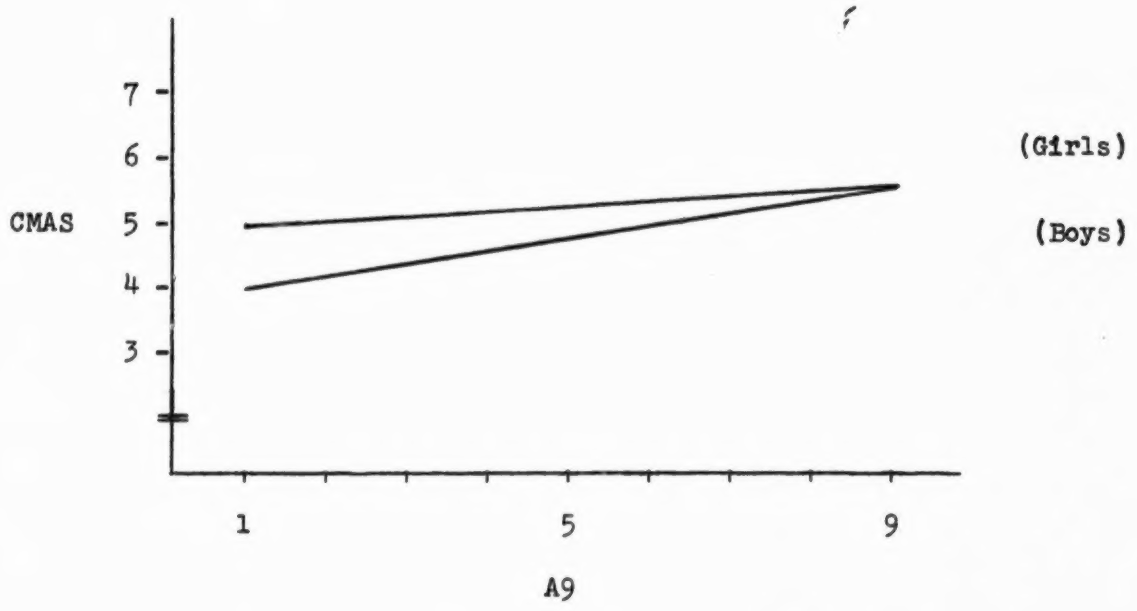


Figure 4.05. Increase in CMAS Anxiety as a function of early adolescent Authoritarian Discipline. (Table 4.12, p. 4-70)

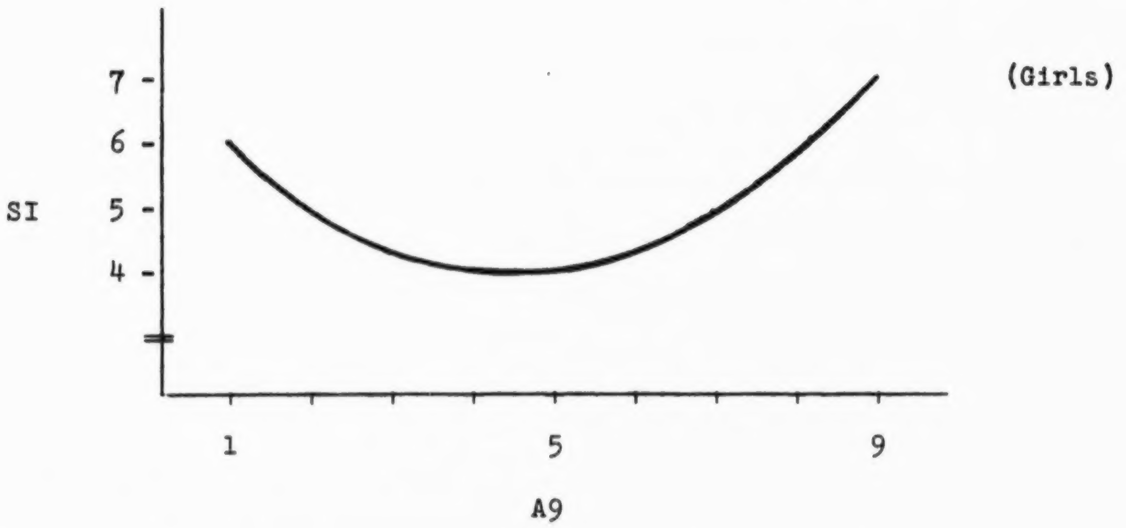


Figure 4.06. Relative increase in CYS Social Inadequacy among girls as a function of early adolescent Authoritarian Discipline. (Table 4.9, p. 4-66)

analysis (Table 4.9) demonstrating this relationship took seventh-grade SI values into account as well as covariance variables included in the control matrix.

Personal Maladjustment. - Feelings of social inadequacy, hostility, and anxiety associated with a social alienation syndrome would be expected to culminate in symptoms of maladjustment. Applied multiple-regression analysis (Table 4.14) demonstrates that this statement probably holds true for both sexes. The two linear regression lines are plotted in Fig. 4.07. Apparently the tendency for Personal Maladjustment to increase with increments in Authoritarian Discipline during the transition into early adolescence is somewhat stronger among girls than among boys.

Preadolescent Conformity and Authoritarianism

The theory and working hypotheses presented schematically in Figures 4.01 and 4.02 postulate that a preadolescent set to avoid fulfilling age-mate expectations (nonconformity) accentuates authoritarianism among adolescents during the period of transformation catalyzed by pubescent changes. The proposed consequence of this interaction between preadolescent nonconformity and adolescent authoritarianism is to be not only increasing rejection by the emerging age-mate society but also a social alienation syndrome. Sex-typed differences are expected since girls tend to undergo pubescent changes earlier than boys. Moreover, cultural expectations are not the same for the two sex roles.

When the influences of mental function, family status, and response sets are held constant in a control matrix (Table 4.1), JPQ Energetic Conformity is negatively related to CYS Authoritarian Discipline among girls but not among boys. The negative linear relation for girls has been plotted in Fig. 4.08.

In general, however, the theory that preadolescent nonconformity is a precipitating factor in the development of a social alienation syndrome among authori-

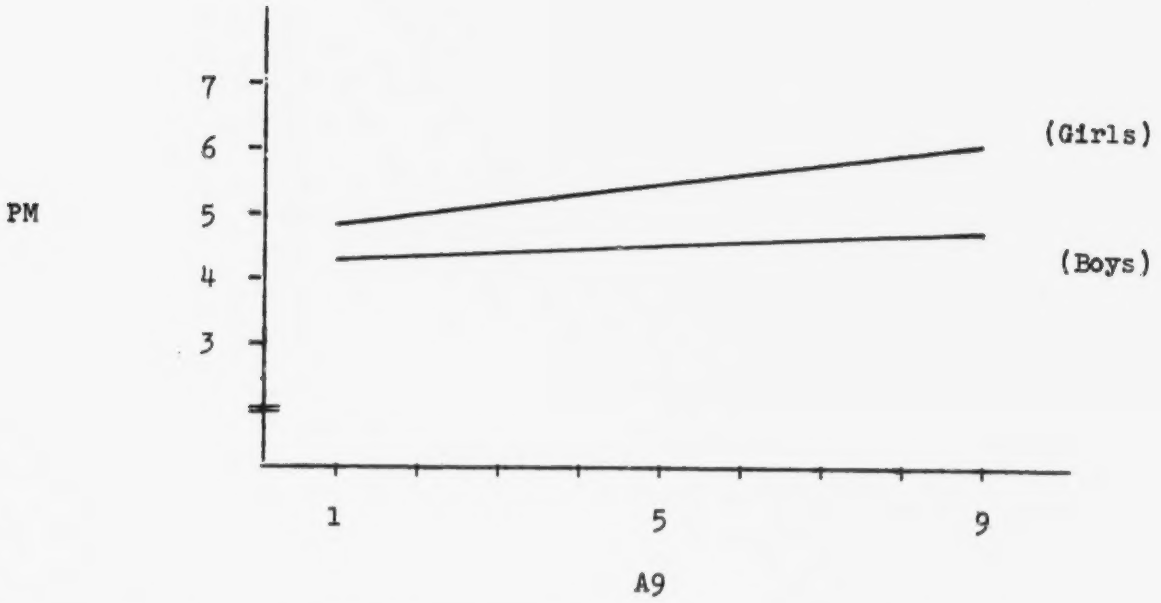


Figure 4.07. Relative increase in CYS __Personal Maladjustment__ as a function of early adolescent CYS __Authoritarian Discipline__. (Table 4.14, p. 4-73)

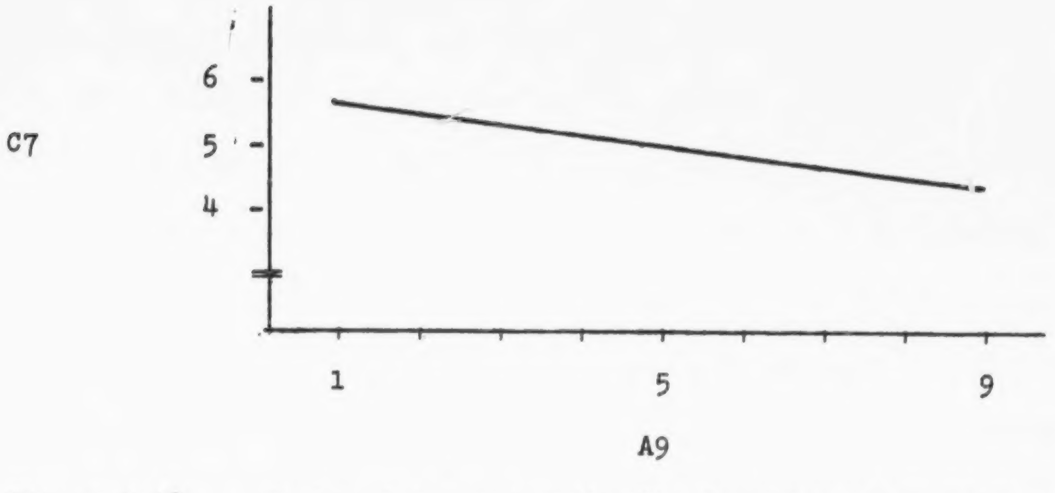


Figure 4.08. Early adolescent __Authoritarian Discipline__ as a negative function of preadolescent __Energetic Conformity__ in the presence of a control matrix. (Table 4.1, p. 4-53)

tarian adolescents is not supported by the evidence. None of the C7.A9 interaction terms in the models of Tables 4.10 to 4.14 have reached significance. There is, however, a significant negative linear relationship (as hypothesized) between preadolescent *Energetic Conformity* and early adolescent *Authoritarian Discipline* for girls. The relationship is demonstrated in Table 4.1 and represented in Fig. 4.08.

Among boys, no predicted relation between preadolescent conformity (set toward peer expectations) and adolescent authoritarianism or an associated symptom of alienation (social inadequacy) is shown either in Figs. 4.06 or 4.08. Nevertheless, when the postulated preadolescent attitudes arising out of family dynamics are taken into account, there appears to be an unpredicted relation between JPQ *Energetic Conformity* and CYS *Authoritarian Discipline* for boys.

The statistical analyses (Table 4.2, p. 4-54) adjusts for differences in CYS *Family Tensions*, CYS *Resentment of Dependency*, CYS *Self Inadequacy*, and CYS *Criticism of Youth*. When these covariation terms are employed instead of the matrix of control variables (as for girls in Table 4.1 and Fig. 4.08), there clearly is an unforseen curvilinear relation between preadolescent JPQ *Energetic Conformity* and subsequent CYS *Authoritarian Discipline* for boys but not for girls. The relation is plotted in Fig. 4.09. Boys who are highly rejecting of authoritarian discipline, as well as those who are highly accepting, score lower upon the preadolescent conformity scale (C7) than do boys in the middle range of the measure of authoritarian discipline (A9). No such relation holds for girls when preadolescent attitudes are held constant.

Adolescent Authoritarianism and Peer Evaluations

Apparently JPQ *Energetic Conformity* does not relate to CYS *Authoritarian Discipline* in predicted ways for either sex role. Nevertheless, preadolescent atti-

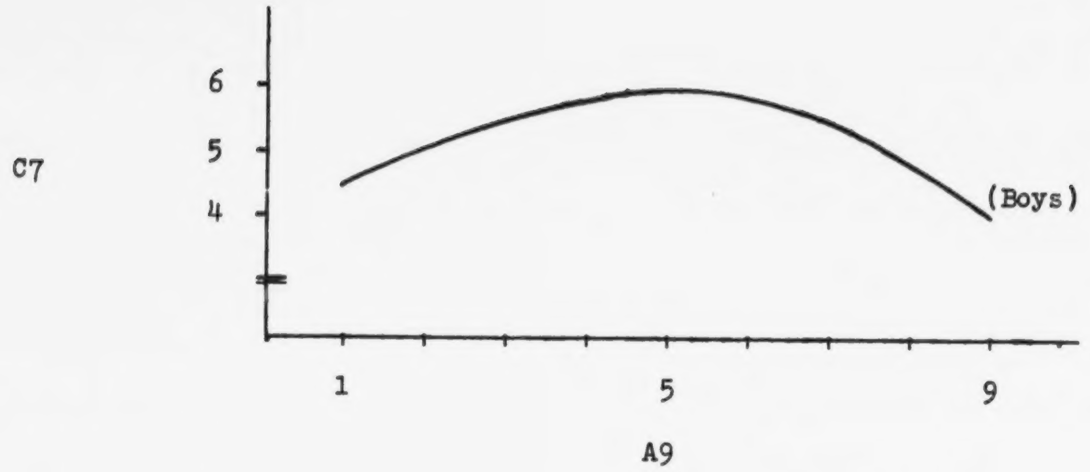


Figure 4.09. JPQ Energetic Conformity as a function of CYS Authoritarian Discipline in the presence of CYS Family Tension, CYS Resentment of Dependency, CYS Self Inadequacy, and CYS Criticism of Youth--instead of control matrix. (Table 4.2, p. 4-54)

tudes toward standards set by peers still may interact with EA authoritarianism to influence age-mate assessments of one another. This possibility has been taken into account in each subsequent analysis.[2]

Person to Be Like. - Relative increases in nominations for Behavior Model (BM9-BM7) were found to be the product of a complex interaction among the variables in the analyses for boys but not for girls (Table 4.6). The interaction is depicted in Fig. 4.10 by different curvilinear regression lines for Boys-High (stanines 7 to 9) and Boys-Low (stanines 1 to 3) in terms of the JPQ Energetic Conformity scale during the seventh grade year.

Person Not to Be Like. - Relative increases in nominations of girls for Negative Behavior Model were found to be a function of the interaction between Authoritarian Discipline and Energetic Conformity but the relations were not as postulated (Table 4.7, p. 4-63). Girls who had been high (rather than low as predicted) on Energetic Conformity and who were at either extreme of the scale for Authoritarian Discipline evidenced the greatest increases in nominations for a "Person Not to Be Like." The interaction, which is restricted to girls, has been plotted in Fig. 4.11. Among

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[2] The analyses in the Statistical Appendix to this chapter have tests for the influence of an interaction between the measures of adolescent authoritarianism and preadolescent conformity (A9.C7) as well as tests for CYS Authoritarian Discipline (A9) as a main effect. Since values for a control matrix are entered, the covariance effects of family status, mental function, and response tendencies have been held constant. Thus the negative linear relation between JPQ Energetic Conformity and CYS Authoritarian Discipline for girls (Fig. 4.08) persists throughout the analyses. On the other hand, no provision has been made for the covariables which revealed a curvilinear relation between C7 and A9 for boys (Fig. 4.09). Thus a series of analyses for both sexes taking into account the covariation effects of preadolescent responses to CYS scales for Family Tensions, Self Inadequacy, Resentment of Dependency, and Criticism of Youth (as initiated in Table 4.2) could be even more revealing if one had the time and means to carry them out.

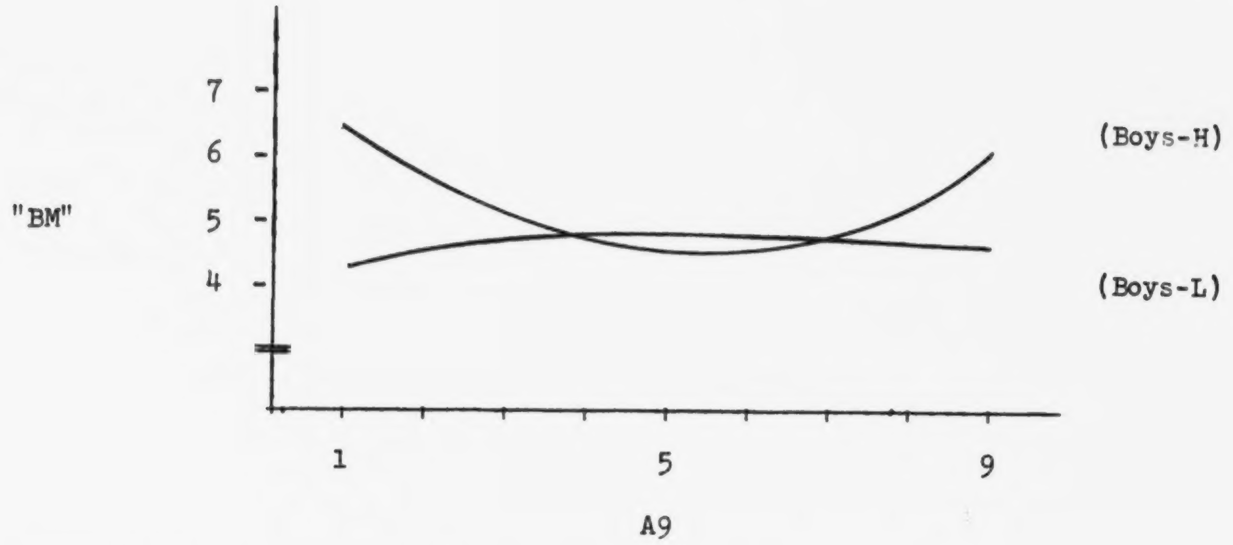

Figure 4.10. Increase in nominations as a Behavior Model for high conforming boys and for low conforming boys. (Table 4.6, p. 4-61)

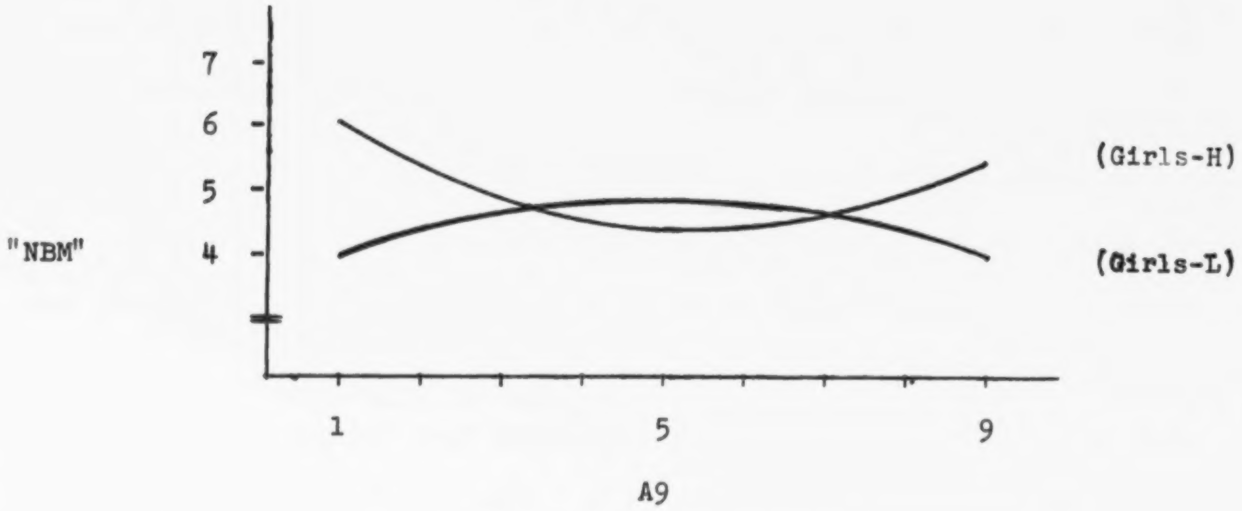

Figure 4.11. Increase in nominations as a Negative Behavior Model for high conforming girls and low conforming girls. (Table 4.7, p. 4-63)

girls low in preadolescent conformity (C7), those at the mean in early adolescent authoritarianism (A9) had the largest number of nominations as a "Person Not to Be Like" (NBM9).

Peer Isolation. - Relative increases in nominations for Left Out (L09-L07) were expected to be related to scores for Authoritarian Discipline (A9) particularly among those scored low on JPQ Energetic Conformity (C7). The statistical analysis (Table 4.8) revealed that the predictions were not as expected. Figure 4.12 indicates that there is a tendency for girls who score at either extreme of the Authoritarian Discipline scale and who are high (rather than low as hypothesized) on the preadolescent conformity measure to have the greatest increases in nominations for Left Out. Since the quadratic analysis in Table 4.8 (wherein P for girls is shown as .07) does not fulfill the decision rule (i.e., P at .05 or less), separate curves for high and low conforming girls are not drawn to represent an interaction in Fig. 4.12. On the other hand, the analyses in Table 4.8 for both sexes support the inference that there is a curvilinear relation between authoritarianism (A9) and isolation (LO).

As indicated in the graphic representation (Fig..4.12), however, the curvilinear relationships of LO to A9 for the two sexes are almost mirror images of one another. Boys either high or low in early adolescent authoritarianism tend to have fewer nominations for being Left Out than those in the middle range. On the other hand, girls at either extreme tend to be nominated more frequently for Left Out than the girls toward the middle (stanines 4 to 6 inclusive).

Adult Orientation. - Relative increases in nominations for "look up to older persons for approval" (A09-A07) also failed to depend upon prior degree of conformity (C7) to age-mate expectations. Instead, the regression analysis (Table 4.3) indicates a curvilinear relation between the increments and early adolescent Authoritarian Discipline (A9) for boys. This relation is depicted in Fig. 4.13. Boys

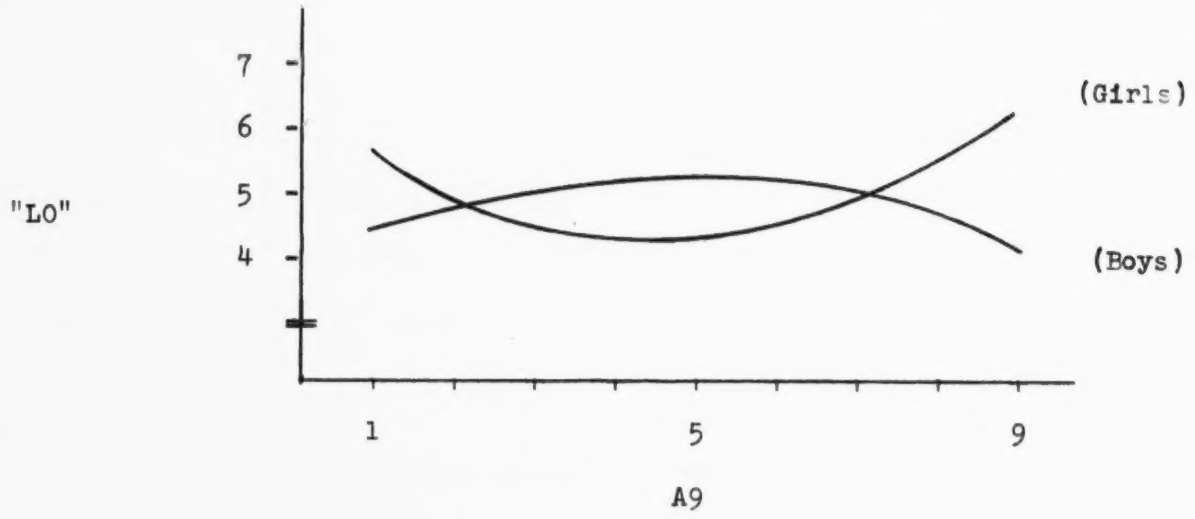

Figure 4.12. Increase in nominations as Left Out as a function of early adolescent Authoritarian Discipline among girls and among boys. (Table 4.8, p. 4-64)

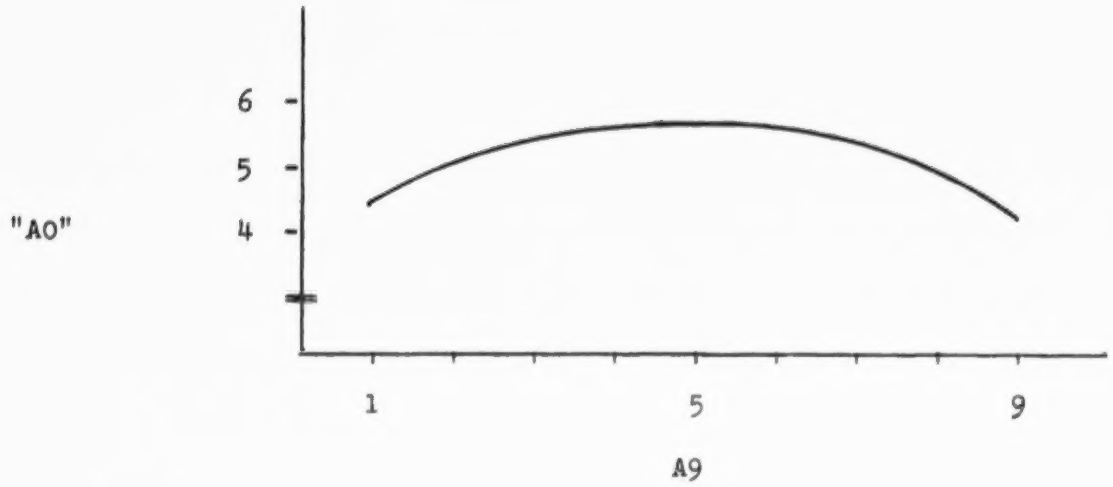

Figure 4.13. Relative increase in nominations for Adult Oriented as a function of CYS Authoritarian Discipline among boys. (Table 4.3, p. 4-56)

who score at either extremity of the CYS Authoritarian Discipline scale have a relative decrease in nominations for being "adult oriented."

Behavior of Autonomy. - The pertinent multiple-regression analysis (Table 4.4, p. 4-58) would lead one to infer that, for both sexes, increases in nominations for "Has Initiative" (HI9-HI7) are not a function of authoritarianism (A9), or of an interaction with preadolescent conformity (C7.A9 or $C7.A9^2$). Thus there is no figure corresponding to Table 4.4 in this chapter.

Relative increases in nominations for "Lacks Initiative," however, are related to early adolescent authoritarianism (Table 4.5). An inverted-U linear relationship between LI9 and A9 which holds for boys, but not for girls, has been plotted in Fig. 4.14. Boys who score in the middle range for Authoritarian Discipline have the greatest increase in such assessments.

Summary of Relations among Variables

Early Adolescent Girls. - Figure 4.15 summarizes relationships demonstrated between variables for girls with references to pertinent figures, tables, and pages. Among girls, who tend to mature at an earlier age than boys, the set to accept authoritarian control is negatively related to preadolescent nonconformity (Fig. 4.08, Table 4.1). The relation is not strong and requires that family status, intelligence, and response tendencies be taken into account. Nevertheless, preadolescent girls who tend to reject age-mate expectations turn out to be the ones most receptive to authoritarian control in terms of their early adolescent self reports. Further analysis (Fig. 4109, Table 4.2) indicates that the relation can be accounted for in terms of measures postulated to reflect parental restrictiveness, ego weakness, resentful dependency, and negative attitudes towards peers (Tables 4.1 and 4.2).

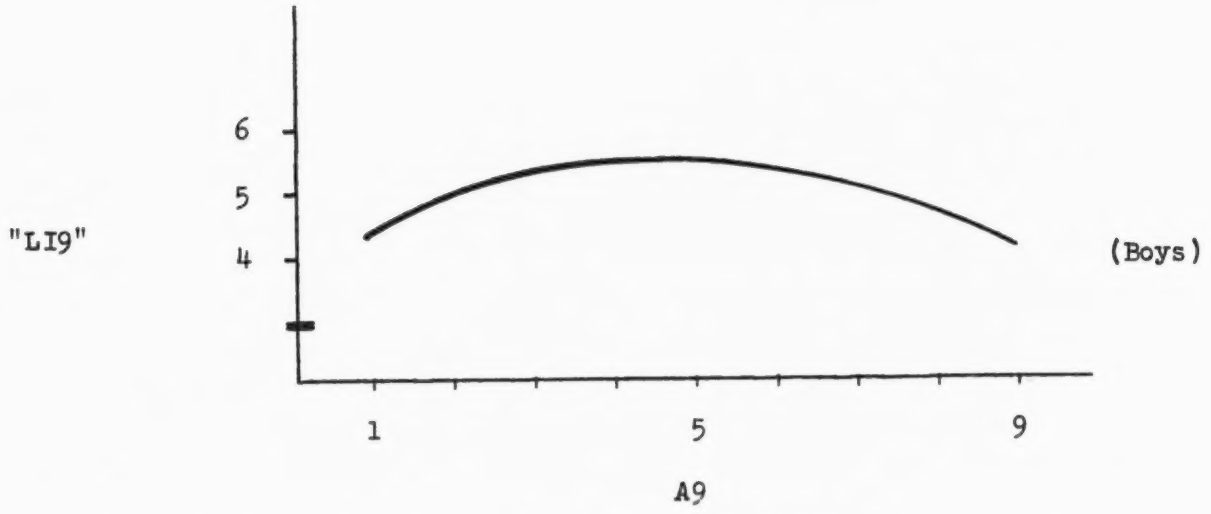

Figure 4.14 Increase in nominations for Lacks Initiative as a function of CYS Authoritarian Discipline among boys. (Table 4.5, p. 4-73)

Fig./Page	Sex/C7	Dependent Variable	Relation to A9	Concomitant Variation	Table/Page
		Emergence of an Alienation Syndrome			
4.03	all girls	CV9 - CV7	/	CM	4.10/67
4.04	all girls	NOS9 - NOS7	/	CM	4.11/69
4.05	all girls	CMAS9 - CMAS7	/	CM	4.12/70
ref. p.18	all girls	AA8	/	CM	4.13/71
4.06	all girls	SI9 - SI7	U	CM	4.9 /66
4.07	all girls	PM9 - PM7	/	CM	4.14/73
		Preadolescent Conformity and Authoritarianism			
4.08	all girls	C7	\	CM	4.1 /53
4.09	all girls	C7	no relation	FT7 et al	4.2 /54
		Adolescent Authoritarianism and Peer Evaluations			
4.10/25	all girls	BM9 - BM7	no relation	CM	4.6 /61
4.11/25	girls-HI	NBM9 - NBM7	U	CM	4.7 /63
	girls-LO		∩	CM	
4.12/27	all girls	LO9 - LO7	U	CM	4.8 /64
4.13/27	all girls	AO9 - AO7	no relation	CM	4.3 /56
ref. p.28	both sexes	HI9 - HI7	no relation	CM	4.4 /58
4.14/29	all girls	LI9 - LI7	no relation	CM	4.5 /59

READ: / = linear; \ = neg. linear; U = curvilinear; ∩ = inverse curvilinear.

Figure 4.15. Summary of relationships between dependent variables and early adolescent Authoritarian Discipline for girls in the Human Talent Research Program with references to locate relevant figures, tables, and pages in the text of the chapter.

The interaction of a set to accept authoritarian control and this prior tendency towards nonconformity does not result in an increased reputation for being Adult Oriented. Neither does the A9.C7 interaction appear to influence peer reputation concerning behavioral autonomy, as measured by nominations for Has Initiative and Lacks Initiative. There is a tendency for highly conforming preadolescent girls who either strongly reject, or submissively accept, authoritarian control in early adolescence to increase in reputation as Negative Behavior Model (Fig. 4.11). Among the nonconformists in grade seven, however, the relationship is inverse to that for those who conformed to peer expectations. Nominations for Left Out (Fig. 4.12), on the other hand, tend to be more frequently directed toward girls who are at either extreme of the scale for authoritarianism in the ninth-grade year. This curvilinear relationship between L09 and A9 (with A07 held constant) is the inverse of that demonstrated for boys in Fig. 4.12.

Early Adolescent Boys. - A markedly different pattern of relations among variables emerges for the boys. Figure 4.16, similar to the one for girls, summarizes the probable relationships among variables during the transformation from preadolescence to early adolescence. Most of the dependent variables are expressed as increases in scores from grade seven to grade nine; for example, CY9-CY7. When applied multiple regression models are written (for example, in Table 4.10, p. 4-67), the seventh grade score is transposed and CY9 becomes a function of CY7 plus other variables. In other words, the pretest is held constant and the posttest becomes a function of ninth-grade Authoritarian Discipline (A9).

Contrary to the theoretical formulation, adolescent boys at either extreme of the Authoritarian Discipline scale (Fig. 4.09) both tend to be relatively nonconforming in their attitudes toward peer expectations prior to pubescence. The tendency is independent of measures of parental restrictiveness, ego weakness, resentful dependence, and negative attitudes towards peers. On the other hand, the relation

Fig./Page	Sex/C7	Dependent Variable	Relation to A9	Concomitant Variation	Table/Page
Emergence of an Alienation Syndrome					
4.03/17	all boys	CY9 - CY7	/	CM	4.10/67
4.04/17	all boys	NOS9 - NOS7	/	CM	4.11/69
4.05/19	all boys	CMAS9 - CMAS7	/	CM	4.12/70
ref. p.18	all boys	AA8	no relation	CM	4.13/71
4.06/19	all boys	SI9 - SI7	no relation	CM	4.9 /66
4.07/21	all boys	PM9 - PM7	/	CM	4.14/73
Preadolescent Conformity and Authoritarianism					
4.08/21	all boys	C7	no relation	CM	4.1 /53
4.09/23	all boys	C7	∩	FT7 et al	4.2 /54
Adolescent Authoritarianism and Peer Evaluations					
4.10/25	boys-HI	BM9 - BM7	U	CM	4.6 /61
	boys-LO		∩		
4.11/25	all boys	NBM9 - NBM7	no relation	CM	4.7 /63
4.12/27	all boys	LO9 - LO7	∩	CM	4.8 /64
4.13/27	all boys	AO9 - AO7	∩	CM	4.3 /56
ref. p.28	both sexes	HI9 - HI7	no relation	CM	4.4 /58
4.14/29	all boys	LI9 - LI7	∩	CM	4.5 /59

READ: / = linear; ╲ = neg. linear; U = curvilinear; ∩ = inverted curvilinear.

Figure 4.16 Summary of relationships between dependent variables and early adolescent Authoritarian Discipline for boys in the Human Talent Research Program with references to locate relevant figures, tables, and pages in the text of the chapter.

can be explained in terms of family background, mental function, and response tendencies (co-variables in the "control matrix" of Table 4.1 but not in Table 4.2). Since the other findings regarding boys have taken the covariables into account, the demonstrated relations for boys are independent of the control measures.

Surprisingly, adolescent boys who score high upon Authoritarian Discipline, as well as those who score low, both are characterized by a decrease in reputation as being dependent upon, or submissive to, adults (Fig. 4.13). Moreover, they both are less frequently nominated as Lacks Initiative (Fig. 4.14). On the other hand, ones who score at either extreme for adolescent authoritarianism (A9) and who were high on conformity to peer expectations (C7) in preadolescence are increasingly perceived as behavior models (BM9-BM7) worthy of emulation (Fig. 4.10). Among boys low in preadolescent Energetic Conformity, however, those with medium values for ninth-grade Authoritarian Discipline (stanines 4, 5, and 6) more frequently have increases in nominations as Behavior Model (the U-curve in Fig. 4.10 tends to be inverse).

Sex-Typed Differences. - In contrast to the findings for girls, peer relations for authoritarian boys seem to improve in early adolescence. Consistent with these findings, authoritarian adolescent girls display elements of an alientation syndrome to a greater degree than do boys. For example, the greatest relative increase in CYS Social Inadequacy (SI9-SI7) occurs among girls scoring high on the CYS Authoritarian Discipline scale (A9), and is not present to any significant extent among the boys (Fig. 4.06 and Table 4.9). Likewise, anxiety about autonomy does not appear to accompany authoritarianism in boys as it does in girls (Table 4.13). Being somewhat rejected by age-mates, authoritarian girls evidence greater increase in negativism toward peers (i.e., CYS Criticism of Youth in Fig. 4.03) and toward society in general (i.e., CYS Negative Orientation to Society in Fig.

4.04). Although authoritarian boys increased in feelings of CMAS Anxiety (Table 4.12 and Fig. 4.05), they did not manifest a highly significant degree of CYS Personal Maladjustment (Table 4.14 and Fig. 4.07) as did authoritarian girls.

Discussion and Interpretation of Findings

The results of this study of personality development consistently support the hypothesized transformation of attitudes into an alienation syndrome among authoritarian adolescents with some clear sex-typed differences. The strongest element in this syndrome is the marked increase in CYS Criticism of Youth (Fig. 4.03) in relationship to early adolescent CYS Authoritarian Discipline for both sexes. Similar increases also may be observed in CYS Negative Orientation to Society (Fig. 4.04), in CYS Personal Maladjustment (Fig. 4.07), and in responses to the CMAS Anxiety scale (Fig. 4.05). Among girls, however, the anxiety about autonomy reported in grade eight (independence vs. dependence) apparently is related to the degree of ninth-grade authoritarianism (Table 4.13). On the other hand, among boys entering early adolescence, increments in CYS Authoritarian Discipline are not paralleled by increases in feelings of social inadequacy (Fig. 4.06) and A9 bears no relationship to anxiety about autonomy in grade eight (AA8 in Table 4.13). Girls either high or low in early adolescent authoritarianism (Fig. 4.06), unlike the boys, show the smallest increments upon the CYS scale for Social Inadequacy. The summary of relationships among variables for girls in Fig. 4.15 indicates that those who report the smallest increments in feelings of social inadequacy (that is, the girls at either extreme in early adolescent authoritarianism) are the ones least likely to have increased nominations as Left Out (Fig. 4.12). On the other hand, the summary in Fig. 4.16 reveals that, for "all boys," the only U-shaped curvilinear relationship to authoritarianism (A9) is found when increments in Left Out are analyzed.

Boys in the middle range of CYS Authoritarian Discipline are nominated less frequently as "left-out" than those at either extreme.

The postulated basis for the development of this alienation syndrome among authoritarian adolescents, however, is rather clearly negated by the evidence. Most significant is the fact that elements of the syndrome (CY9, NOS9, CMAS9) increase in a similar manner among authoritarian adolescents of both sexes who were conforming as well as nonconforming in their attitudes toward a significant proportion of the HTRP population. Among early adolescents of both sexes, increases in criticism of age-mates, alienation from society, and manifest anxiety clearly are related not only to pretest scores for the three elements of the alienation syndrome, but also to the degree of authoritarian submission and aggression reported in the posttest year. Despite the finding that ninth-grade authoritarian girls are the ones who were less conforming in seventh grade (Fig. 4.08), nonconformity and peer rejection do not appear to be a crucial factor in the development of the alienation syndrome among authoritarian adolescents. Instead, the analyses show only two significant interations of preadolescent conformity with early adolescent authoritarianism (both being quadratic $C7A9^2$ terms rather than a linear C7A9 moderator variable). They concern (1) boys high and low in C7 with reference to nominations for "person to be like" (that is, BM9-BM7 for boys in Fig. 4.10 and Table 4.6), and (2) nominations for "person not to be like" (that is, NBM9-NBM7 for girls in Fig. 4.11 and Table 4.7). In each instance, the curvilinear relationships to early adolescen authoritarianism for the conformists and the nonconformists in grade seven tend to be the inverse of the other.

The findings seem to be substantial enough to require some post hoc rationale. First, the results point to the weak link in the theory; namely, the assumption that preadolescents who scored high upon the scale for JPQ Energetic Conformity would continue to conform to the evolving adolescent culture in subsequent years. Unfortunately, no direct measure of conformity was available in grade nine. Thus there was no way to ascertain whether or not authoritarian youngsters classified as conforming in preadolescence could be so classified in grade nine.

The real problem, however, is to explain why, among girls who were energetic conformers in preadolescence, the ones at either extreme in early adolescent authoritarianism could turn out to be the ones who increase most in nominations as negative models for behavior (Fig. 4.11). Among preadolescent nonconformers, the ones at either extreme in early adolescent authoritarianism tend to be less frequently named as "persons not to be like" (Fig. 4.11). The relationship is expressed by an inverse U-shaped curve. Moreover, the U-shaped curvilinear relationship recurs for all girls when increments in social inadequacy (Fig. 4.06), and in being "left out" (Fig. 4.12) are analyzed. The common element in the three figures is that the girls represented as negative models, feeling left out, or as being avoided by their age-mates may be at either extreme of the scale for Authoritarian Discipline.[3]

Within the adolescent culture, girls encounter many changes in the conception of what constitutes desirable behavior. For example, in the California Growth Study, there were dramatic shifts and even reversals in value standards and in the relative rankings of desirable attributes when early adolescent girls were asked to evaluate on another (Tryon, 1939). Whereas a quiet, demure, rather ladylike demeanor was favored among preadolescent girls, the accepted girls by age fifteen were active, talkative, and marked by a kind of "aggressive good fellowship."

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[3] The quadratic hypothesis was tested in Tables 4.7, 4.8, and 4.9 as an alternative to the linear one because Adorno et al (1950, pp. 481, 771-773) had found a "rigid" low-scorer syndrome which had most in common with the over-all "high" pattern found among those who score near the maximum on scales measuring authoritarianism. In each figure, the relation of early adolescent Authoritarian Discipline to increases in the dependent measure turns out to be curvilinear.

More recent studies in Textown (McGuire, 1956) and Prairie City (Peck & Havighurst, 1960) also would lead one to postulate that flexibility in personal makeup still is an important precondition for acceptance among age-mates. If this is true, rigidity probably is the underlying factor common to both high and low authoritarian adolescence. Among the girls at both extremes, there are those who developed a pattern of social behavior which served them well prior to adolescence. They probably are the ones who would tend to stay with the temporarily successful behavior pattern in the face of changing values and expectations on the part of age-mates.

Although the rejected high authoritarian and low authoritarian girls are similar with regard to increased feeling of social inadequacy, they otherwise are quite different in their reactions to peer rejection. Consistent with the element of authoritarian aggression built into the CYS Authoritarian Discipline scale, the high authoritarian girls who reported conformity in preadolescence display increased feelings of negativism toward age-mates and society in general. The increases are greater than those evidenced by authoritarian boys whose peer relations are somewhat improved during early adolescence. Rejection of authoritarian girls also may underlie, to some extent, their anxiety regarding behavioral autonomy and greater increase in feelings of personal maladjustment.

Among boys, however, a different picture emerges than the one for girls. Both the high and the low authoritarian boys are perceived by their peers as becoming less adult oriented (Fig. 4.13) and less lacking in initiative (Fig. 4.14). Moreover, boys who conformed in grade seven and who were at either extreme of the Authoritarian Discipline scale in grade nine turned out to be the ones with greatest increases in positive nominations as a behavior model (Fig. 4.10).

The foregoing results may reflect the emergence of two kinds of leadership or "wheel" roles in the adolescent society; namely, those filled by authoritarian and non-authoritarian adolescents. If so, the pattern of personality transformation underlying the emergence of authoritarian leadership in early adolescence may be quite different from that underlying the emergence of non-authoritarian leadership. Here, "leadership" may be interpreted in the sense of being a "wheel" as the term is employed in adolescent societies, i.e., they "make the wheels go 'round," and "get things done," "they're tops." To be specific, the results of data analyses suggest that the assumption of leadership or "wheel" roles on the part of authoritarian boys is motivated by a manifest desire to rebel against the domination and control of adult authority (decrease in Adult Oriented and in Lacks Initiative) accompanied by a driving fear of failure (increase in CMAS Anxiety).

Conclusions

Earlier in this chapter, before moving "from theory to testable hypotheses," four questions were asked about the transformation of attitudes and other elements of personality. On the basis of evidence presented above, the questions can be answered in the following manner. An assumption is made that the analyses have demonstrated a reasonable amount of construct validity (Cronbach & Meehl, 1955). Note the different finding for (a) boys, and (b) girls.

(1) Lack of conformity as measured by JPQ Energetic Conformity in grade seven is positively related to CYS Authoritarian Discipline among girls in grade nine, but not among boys.

    (a) The negative linear relation for early adolescent girls (Fig. 4.08) can be explained in terms of preadolescent attitudes toward family, self, and age-mates measured by the CYS scales for Family Tensions, Resentment of Dependency, Self Inadequacy, and Criticism of Youth. This finding, which does not appear to hold for boys, was predicted in Figs. 4.01 and 4.02.

(b) The curvilinear relation between preadolescent conformity and early adolescent authoritarianism found among boys (Fig. 4.09) appears only when measured differences in family background, mental function, and response tendencies have not been partialed out in the statistical analyses (compare regression models in Tables 4.1 and 4.2 of the Statistical Appendix which follows).

(2) There is a curvilinear relation between the acceptance of authoritarian standards for oneself (submission) and others (aggression) as measured by CYS Authoritarian Discipline, on the one hand, and messures of peer acceptance, on the other, during early adolescence.

(a) Boys who score at either extreme of the scale for authoritarianism in grade nine are more frequently nominated as Left Out (Fig. 4.12), as well as being less often named as Adult Oriented (Fig. 4.13) and for Lacks Initiative (Fig. 4.14) than they were back in grade seven. The relation becomes more complex, taking the form of an interaction in the case of nominations as a Behavior Model (Fig. 4.10). Among boys who were high in Energetic Conformity in grade seven, those at either extreme of the CYS scale for Authoritarian Discipline are the ones who tend to increase in nominations for "person to be like" in grade nine. The discussion has directed attention to the possibility that two kinds of "leaders"--authoritarian and non-authoritarian--emerge among boys moving into early adolescence.

(b) On the other hand, girls who score at either extreme of CYS *Authoritarian Discipline* are increasingly rejected as a "person not to be like" (*Negative Behavior Model* in Fig. 4.11) and more frequently nominated as being "left out" (*Isolated* in Fig. 4.12) in the ninth grade. The discussion has turned to the possibility that high and low authoritarian girls share an element of personal rigidity which makes them less flexible in shifting from patterns which led them to be accepted by age-mates at an earlier time. As stated in "4" below, however, high authoritarian girls tend to display increased feelings of negativism toward age-mates and society in general compared with those low upon the CYS scale.

(3) The manifestation of an alienation syndrome among boys as well as girls during early adolescence is positively related to CYS *Authoritarian Discipline*. Both sexes display increases upon the CYS scales for *Criticism of Youth* (Fig. 4.03), *Negative Orientation to Society* (Fig. 4.04), and *Personal Maladjustment* (Fig. 4.07), as well as increments in CMAS *Anxiety* (Fig. 4.05).

(a) Examination of the pertinent figures and tables with statistical analyses show that the foregoing relations are not as strong for boys as for girls.

(b) Girls at both extremes of the CYS scale for *Authoritarian Discipline* ("low scorere" as well as "high scorers") less frequently report feelings of *Social Inadequacy* (Fig. 4.06). Moreover, regardless of preadolescent conformity, the degree of authoritarianism among girls in grade nine is positively related to reported feelings of anxiety about personal autonomy (Table 4.13).

(4) The degree to which age-mates accept, avoid, or reject authoritarian adolescents does depend upon the extend to which these authoritarian boys or girls conformed to peer expectations in preadolescent years. On the other hand, elements of the alienation syndrome (see conclusion "3") are manifested by conforming as well as non-conforming authoritarian adolescents.

(a) Boys who fall at either extreme of the CYS scale for Authoritarian Discipline and who scored high on JPQ Energetic Conformity in preadolescence are increasingly accepted as positive Behavior Models (Fig. 4.10) in early adolescence (see conclusion "2a" above).

(b) Girls who fall at either extreme of the CYS scale for authoritarianism in grade nine, and who scored high on the JPQ measure of conformity in grade seven, were the ones increasingly perceived as Negative Behavior Models (Fig. 4.11) and as being Left Out (Fig. 4.12) during early adolescence. The interpretation that holding rigidly to patterns of behavior led to their rejection by age-mates is reinforced by the manner in which the same girls report increased feelings of Social Inadequacy (Fig. 4.06).

STATISTICAL APPENDIX

The quantitative representation of change or development in human beings in not a simple matter. According to the recent report of a conference on Problems of Measuring Change (Harris, 1963), one cannot simply infer whether or not a change has taken place by gathering sets of data wherein two or more measurements of the same variable have been made at different times for the same population. Furthermore, Burke's exposition of the two basic positions on the relation between measurement scales and statistical models (in Marx, 1964, pp. 147-159) had to be considered. We adopted the position that sets of numbers are the outcomes of measurement operations and that statistical techniques are methods for drawing inferences about these sets of numbers.

As indicated in Chapter II, the research team had been guided by a basic "dimensional" model supplemented by a "catalytic" model designed to permit the explanation of changes over periods of time. Each model had a mathematical counterpart as set forth earlier in the mathematical formulations of Chapter II and explained in greater detail in Appendix B. The account which follows illustrates the application of a powerful technique to represent and to test change over time--applied multiple linear regression (Bottenberg & Ward, 1963). The HTRP staff soon became aware that many widely-employed procedures, such as analyses of variance and analyses of covariance, are merely special cases of this general multivariable approach.

Method

Sample Population

The sample population for the study of the transformation of personality attributes consisted of 288 Anglo boys and 288 Anglo girls drawn from the four HTRP communities. Besides being Anglo-American, those drawn had to be subjects for whom the necessary data were available in grades seven, eight, and nine. By and large, the ones who missed testing sessions most frequently were from lower-lower class family backgounds regardless of subcultural classifications. Thus the findings could be expected to hold true only for the offspring of "common man" Anglo-American families. Moreover, boys and girls from Negro-American and Latin-American backgrounds were not represented in the study. Populations of Negro-American and Latin-American young persons varied too much from one location to another to draw inferences about subcultural variations in authoritarian personality (Christie & Garcia, 1951).

Variables and Hypotheses

The instruments employed have been specified in Fig. 4.02 as well as in the text. Each type of instrument represents a variable and the relationships in the figure reflect hypotheses to be tested for boys and for girls. An assumption was made that, by and large, seventh-grade measurements reflected preadolescence (PA) and that ninth-grade responses represented early adolescence (EA). Both the nomination data depicting peer relations and the attitude scales corresponding to personality attributes are fully described in Appendix A.

All distributions of scores, index values, and nomination frequencies were transformed into stanine values 1 to 9, with a mean of 5 and a standard deviation of 2.0 for the total sample (McGuire et al., 1960). Because sociometric data typically have a truncated distribution, the nomination stanines obtained ranged from 4 to 9, with a mean of 5.

Regression Technique

A complete account of the regression technique, the necessary assumptions, and tests of significance may be found in a microfilm copy of Foster's dissertation (1963). The account here is designed to supplement the mathematical formulations and statistical procedures set forth earlier in Chapter II and later in Appendix B.

Ordinarily, applied multiple linear procedures require that each hypothesis be stated in terms of one or more specific restrictions to be imposed upon a "full" regression model. According to Bottenberg & Ward (1963), a restricted model is compared with the full model by means of an F ratio. The computational formula is

$$[4.00] \qquad F = \frac{(R_1^2 - R_2^2) / df_1}{(1 - R_1^2) / df_2}$$

where

R_1^2 = squared multiple correlation (MC^2) obtained with the unrestricted or full model.

R_2^2 = squared multiple correlation obtained with the restricted model.

df_1 = the number of unknown parameters in the full model minus the number of unknown parameters in the restricted mode.

df_2 = N minus the number of unknown parameters in the full model.

Alternative Approaches to Multiple-Regression Procedures

Applied multiple-regression procedures may follow either of the two approaches to the selection of the most potent subset of predictor variables for a given criterion:

(1) Begin with the single best predictor and add others one at a time until there is no significant gain in predictive efficiency (Schultz & Goggans, 1961). In this approach, we employ the F ratio to compare an elaborated model (R_1^2) with a preceding restricted model (R_2^2) which is a subspace of it.

(2) Begin with all possible predictors in an unrestricted or full model and delete inefficient predictor variables one at a time by forming restricted models (Bottenberg & Ward, 1963). The deletion is accomplished by setting the partial regression coefficient of the deleted variable equal to zero (e.g., $m = 0$). Then the F ratio compares the MC^2 values of the full model and the restricted model which is a subspace of the more inclusive regression model.

To reduce the number of computations required and to show the process of building regression models corresponding to the theory and hypothesis being tested, we elected to follow a variation of the first approach. The first entry in each table is a regression model which specifies conditions under which the hypotheses are to be tested. For example, in Table 4.1 to follow, a "control matrix" (described next) is to be included in each successive model. Further, in Table 4.2, family tensions together with personal feelings and attitudes (FT, I, RS, CY) are taken into account in the initial and elaborated models. Accordingly, the first regression model written to represent the building and testing of a hypothesis may be termed a "conditional model".

After writing the conditional model to specify the conditions and relations to be kept constant throughout the whole set of regression models in any given table, the process of adding potential predictors begins. Thus a series of elaborated models is written and the last of each series corresponds to Bottenberg & Ward's "full model."

For persons familiar with analysis of variance, each added variable represents a potential source of variation to be tested for significance. Specification of conditions and relations to be kept constant in each regression model (for example, by including a "control matrix") corresponds to the special case of multivariate analysis known as analysis of covariance.

Control Matrix

The object of the statistical analysis was to determine the probability of relations among hypothesized variables (Fig. 4.02) which could not be accounted for in terms of CTMM Intelligence (IQ), an Index of Social Status (SS), Agreement Response Tendency (ART), Extremist Response Tendency (ERT), or any linear combination thereof. In tables to follow, weighted vectors (i.e., sets of scores) for IQ, SS, ART, and ERT are represented collectively in a control matrix (CM). Since covariance terms are really employed, this also could be called a covariance matrix.

Formulation of Multiple Regression Models

Multiple regression analysis is employed to examine the relation between a criterion or dependent variable and two or more predictors or independent variables. The coefficient of multiple correlation (R) serves to indicate the accuracy of prediction. Multiple correlation squared (R^2 or MC^2) expressed as a decimal represents the proportion of variance in the criterion which is predictable from, or explained by, a linear combination of m-1 predictors. The total system of predictors and a criterion has $\underline{m}$ variables and employs scores from $\underline{n}$ subjects (288 boys and/or 288 girls in this study).

The most common type of regression calculated is the linear or straight-line form illustrated in the initial regression model written for each of the tables to follow. A shorthand form of writing models has been employed in each of the tables. For example, the initial conditional model in Table 4.1 permits an estimate of the proportion of variance (R^2) in preadolescent scores on a scale used to measure conformity (C7) which could be explained by the control matrix

[4.01] $$C7 = U + CM + E1$$

A more precise statement not only would use capitals to designate vectors (i.e., sets of scores) but also would employ small letters to refer to unknown parameters (i.e., the partial regression weights to be derived).

$$C7 = uU + cmCM + E1$$

where

C7 = a continuous criterion vector of dimension $\underline{n}$ in which the elements are scores for JPQ Energetic Conformity. These are the 288 C7 scale scores for boys and, in a separate computation, the 288 values for girls.

U = a unit vector of dimension $\underline{n}$, in which the elements are ones. (The intercept of a regression line, when plotted on a pair of axes is the value of the coefficient associated with the unit vector i.e., $\underline{u}$).

CM = a continous set of values (vector of dimension $\underline{n}$) for the control matrix representing weighted sets of scores for mental function (IQ), family status (SS), and response sets (ART, ERT).

u,cm = unknown coefficients (i.e., partial regression weights to be estimated by least squares procedures).

E1 = a residual vector of dimension $\underline{n}$, in which the elements are discrepancies between observed C7 scores and the values (C7') predicted by the regression equation 4.01 (the error sums of squares, ESS, is the sum of the squared element or values in E1).

Comparison of Conditional and Elaborated Models

The first estimate of criterion values, $(C7'_1)$ in Table 4.1, is made from sample-membership data (mental function, family status, response tendencies). This has been termed the conditional model. The second estimate of criterion values $(C7'_2)$ is made so as to include data relevant to the hypotheses to be tested. In Table 4.1, for example, the hypothesis is that preadolescent conformity (C7) is a negative linear function of early adolescent authoritarianism (A9). Consequently, equation 4.01 is elaborated by including a vector of A9 scores among the predictors. The elaborated model

$$[4.02] \qquad C7 = U + CM + A9 + E2$$

could be written with unknown coefficients

$$C7 = uU + cmCM + aA9 + E2$$

where

A9 = a continous predictor vector of dimension n, in which the elements are scores on the CYS Authoritarian Discipline in ninth grade.

u,cm,a = unknown coefficients (i.e., partial regression weights).

E2 = the residual vector of dimension n in which the elements are discrepancies between each subject's observed C7 scores and the C7' values predicted from equation 4.02.

In Table 4.1, as well as those which follow, R^2 values have been computed, employing each regression model for boys and for girls. An F ratio, which appears earlier as equation 4.00, was used to test whether or not the inclusion of an added predictor variable (A9) made a significant difference in R^2 (i.e., reduced the error sum of squares, ESS, significantly).

Polynomial Forms of Variables

Assume that variable y is a polynomial function of variable x. Then

$$y = a_0 + a_1x + a_2x^2 \ldots + a_px^p$$

where $a_0, a_1, a_2, \ldots a_p$ are constants. When plotted on x and y axes, a polynomial form of degree p may display as many as p-1 changes in direction of the plot. Thus with linear forms of a variable, where p = 1, there is no change in direction and y is a linear function of x. This is the relation between C7 and A9 plotted in Fig. 4.08. In curvilinear forms of a variable, where p = 2, there is one change in direction of the function. This is the relation between C7 and A9 plotted as Fig. 4.09 in the body of the chapter.

To test the hypotheses of a curvilinear relation between preadolescent nonconformity (C7) and subsequent authoritarianism (A9) an additional restricted regression model appears in Table 4.1 stated in short form.

[4.03] $$C7 = U + CM + A9 + A9^2 + E3$$

The more precise form would be

$$C7 = uU + cmCM + aA9 + a_2A9^2 + E3$$

where

$A9^2$ = a polynomial vector of dimension n, the elements of which are the squares of the elements in vector A9.

a_2 = an unknown coefficient of $A9^2$ (i.e., a partial regression weight to be estimated by means of a least squares procedure).

The F ratio in Table 4.1 indicates that the squared or quadratic term ($A9^2$) does not make a significant contribution to explaining variation in criterion scores (C7) over and above the linear regression. The test involves computations for and a comparison of the R^2 values from models 3 and 2. In other tables, however, the quadratic term permits a significant gain in predictive efficiency and relationships between variables can be plotted more precisely (e.g., Table 4.5 and Fig. 4.14). Figures illustrating forms of polynomial with $p = 1$, $p = 2$, and $p = 3$, together with applications of the second-order polynomial form in tests of theory, are presented by Bottenberg and Ward (1963, pp. 61-68).

Multiple Regression Models with an Interaction Term

The HTRP staff began to employ interaction vectors when the catalytic model had to be represented mathematically as reported in Chapter II. Two predictors may be said to "interact" when the level of one is believed to vary according to the level of the other. The problem originally was termed "moderated multiple regression" by Saunders (1956) who set forth a mathematical basis, a geometric representation of results, and provided some examples of moderator variables in prediction. Until the high speed electronic computer became available, however, most research designs approached the problem by means of analyses of covariance or by employing interaction terms (i.e., by selecting sub-populations to represent components) in analysis of variance. Recently, Bottenberg and Ward (1963, pp. 69-75) provided a theoretical basis for generating interaction vectors in regression models to express hypotheses and the means of combining them with a polynomial form.

The use of interaction vectors in both linear and quadratic forms begins in Table 4.3 which is to be discussed later under the heading, "tests of hypotheses." For example, in models 5 and 6 therein, the interaction vector C7A9 forms a continuous distribution of dimension n. Values for the C7A9 vector are obtained by multiplying the preadolescent conformity scores (C7) by subsequent authoritarian scores (A9) for each subject in turn to obtain product values for all n elements of the vector. To illustrate, the C7A9 value obtained for a person whose stanine score for conformity in grade seven was "4," and whose score for authoritarianism was "7," would be the product of (4) (7) or 28.

Model 7 in Table 4.3 includes a quadratic interaction vector ($C7A9^2$) whose n values are obtained by squareing the elements entered in the original C7A9 vector. Further explanations of the use of product vectors are included in the statistical analyses which test specific hypotheses by means of multiple regression models and statistical procedures.

Tests of Hypotheses

The theory of nonconformity as a precondition of an alienation syndrome among authoritarian adolescents has been summarized in Fig. 4.01. The hypotheses to be tested follow from the theory and they are presented schematically in Fig. 4.02 with references to specific variables. The variables are named again with code letters and a "7" or "9" to designate school grade in the title of each statistical table. Additional figures showing plotted results of statistical analyses already have been discussed in the body of the chapter. This part of the appendix documents the several analyses of data carried out in the research. The analyses as such should be of interest to persons who wish to know the manner in which multiple-regression procedures can be employed instead of analysis of variance or analysis of covariance. The methods illustrated herein not only serve to identify significant sources of variation and covariation but also solve some of the statistical problems posed by repeated measures.

Preadolescent Nonconformity and Subsequent Authoritarianism

In accordance with the schematic presentation of hypotheses in Fig. 4.02, the first task is to demonstrate among authoritarian adolescents (A9) a prior tendency towards nonconformity (C7). Two questions arise. When mental function, family status, and response tendencies are held constant by means of a control matrix (CM), is there a probable relation between the two variables for boys and for girls? Next, for either sex, is there a basis for earlier nonconfomity in the authoritarian adolescent when the preadolescent is dependent upon highly restrictive parents and rejects age-mates?

Table 4.1 summarizes a multiple-regression test of the hypothesis that scores upon JPQ Energetic Conformity (C7) are a negative linear function of Authoritarian Discipline (A9) as measured subsequently in early adolescence. The three regression models and the F ratios employed to compare computed multiple regression values (R^2) already have been discussed in the sections upon methods. Analysis shows that the postulated relation between adolescent authoritarianism and earlier nonconformity probably holds true for girls but not for boys. The negative linear relation between earlier C7 and A9 for girls has been illustrated in Fig. 4.08.

Table 4.2 presents a test of hypothesized relations between authoritarianism in early adolescence (A9) and preadolescent conformity when control variables (CM) are disregarded. Instead, the possibility that nonconformity may be due to the dependency upon highly restrictive parents and the incorporation of their negative attitudes toward aspects of the emerging peer culture is represented operationally and tested. Accordingly, each model has vectors for CYS scale scores reflecting Family Tensions (FT7), Self Inadequacy (I7), Resentment of Dependency (RD7), and Criticism

TABLE 4.1

Relation of Preadolescent JPQ Energetic Conformity (C7) to Early Adolescent CYS Authoritarian Discipline (A9) with the Influence of Concomitant Variables Partialed Out by the Presence of a Control Matrix (CM). (Fig. 4.08, p. 4-21)

	R^2		Regression Model
	Boys	Girls	
1.	.0338	.0143	$C7 = U + CM + E1$
2.	.0349	.0293	$C7 = U + CM + A9 + E2$
3.	.0398	.0349	$C7 = U + CM + A9 + A9^2 + E3$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
Authoritarian Discipline								
Linear	2-1	1/282	.32		2-1	1/282	4.36	.05
Quadratic	3-2	1/281	1.43		3-2	1/281	1.63	

TABLE 4.2

Relation of Preadolescent JPQ Energetic Conformity (C7) to Early Adolescent CYS Authoritarian Discipline (A9) in the Presence of Preadolescent CYS Family Tensions (FT7), CYS Self Inadequacy (I7), CYS Resentment of Dependency (RD7), and CYS Criticism of Youth (CY7). (Fig. 4.09, p. 4-23)

	R^2		
	Boys	Girls	Regression Model
1.	.0457	.0435	$C7 = U + FT7 + I7 + RD7 + CY7 + E1$
2.	.0465	.0498	$C7 = U + FT7 + I7 + RD7 + CY7 + A9 + E2$
3.	.0594	.0578	$C7 = U + FT7 + I7 + RD7 + CY7 + A9 + A9^2 + E3$

	Boys				Girls			
Source of Variance	Models	df	F	p	Models	df	F	p
Authoritarian Discipline								
Linear	2-1	1/282	.24		2-1	1/282	1.87	
Quadratic	3-2	1/281	3.85	.05	3-2	1/281	2.38	

of Youth (CY7). Under these circumstances, there is no linear relation between A9 and antecedent C7 for either sex; but, for boys, there is a curvilinear relation very close to the .05 level of confidence which has been plotted earlier in Fig. 4.09. Early adolescent boys at both extremes of the scale to measure authoritarianism (A9) tend toward preadolescent nonconformity. When the concomitant seventh grade measures are taken into account only early adolescent males in the middle range of scores for *Authoritarian Discipline* had antecedent scores which reflected an attitude of conformity to the peer culture.[4]

Analyses of Nomination Data Reflecting Peer Relations

Adult Oriented. - Table 4.3 employs full and restricted models written to test the hypothesis that age-mate increases in nominations for being "adult oriented" (A09) are dependent upon the degree of authoritarianism reported by early adolescent boys and girls, either as an independent source of variation (A9) or in interaction with preadolescent conformity (A9C7). Not only do the models include a control matrix (CM) but also, on the right hand side, there is a vector for preadolescent nominations as being "adult oriented" (A07) so that change always is represented and cannot be attributed to mental function, family status, or response tendencies. Successive restrictions imposed upon the initial full model follow the pattern outlined above under "Method." Before a product term was written in model 5 to represent interaction (C7A9), model 4 considered the possibility of a separate main effect for preadolescent conformity (C7). Model 7 introduces a vector of

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[4] If the often-employed practice of sampling extremes of distributions for analysis of variance procedures had been followed, this tendency toward curvilinear relations would not have been uncovered. On the other hand, one might argue that, if we had strictly adhered to our decision rule (P = or $>.05$), no mention would have been made of the toward a curvilinear relationship for boys.

TABLE 4.3

Relative increase in Nominations for Adult Orientation (A09) during Early Adolescence as a Function of Preadolescent JPQ Energetic Conformity (C7), and Concomitant CYS Authoritarian Discipline (A9). (Fig. 4.13, p. 4-27)

	R^2		Regression Model
	Boys	Girls	
1.	.0525	.2265	$A09 = U + CM + A07 + E1$
2.	.0528	.2267	$A09 = U + CM + A07 + A9 + E2$
3.	.0697	.2271	$A09 = U + CM + A07 + A9 + A9^2 + E3$
4.	.0699	.2282	$A09 = U + CM + A07 + A9 + A9^2 + C7 + E4$
5.	.0533	.2285	$A09 = U + CM + A07 + A9 + C7 + C7A9 + E5$
6.	.0699	.2290	$A09 = U + CM + A07 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.0735	.2292	$A09 = U + CM + A07 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.00		6-4	1/279	.29	
Quadratic	7-6	1/278	1.08		7-6	1/278	.07	
Authoritarian Discipline								
Linear	2-1	1/282	.09		2-1	1/282	.07	
Quadratic	3-2	1/281	5.10	.05	3-2	1/281	.14	

product terms $(C7A9^2)$ to test the possibility of a significant quadratic interaction (which appears later in Tables 4.8 and 4.9 for other dependent variables).

The analysis in Table 4.3 shows that preadolescent conformity does not interact with later authoritarianism (C7A9) to bring about an assessment of being Adult Oriented (AO9) either for boys or for girls in early adolescence. In fact, for girls, there is no linear or curvilinear relation between being evaluated as Adult Oriented (AO9) and responses to the Authoritarian Discipline scale (A9). On the other hand there is evidence that males at either extreme of the A9 scale less frequently are nominated for being Adult Oriented (AO9) than are boys midway on the authoritarian measure. This outcome, which is contrary to the hypothesis of a positive linear relation, has been plotted in Fig. 4.13.

Reputation for Initiative. - The theory in Fig. 4.01 would lead one to hypothesize that nominations for Lacks Initiative (LI9) from early adolescent age-mates would have a positive linear relation to responses to the Authoritarian Discipline scale (A9). Conversely, reputation for Has Initiative (HI9) should be a negative linear function of authoritarianism. To complete tests of hypotheses following from the theory, the possibility of an interaction between antecedent conformity and subsequent authoritarianism (C7A9) has to be considered in writing the regression models which represent hypotheses to be tested.

Table 4.4 sets forth the multiple-regression analyses of the nominations for Has Initiative (HI9) with provisions for testing A9 as a main source of variation and C7A9 as an interaction. No significant relation, either linear or curvilinear, was found for boys or for girls.

On the other hand, Table 4.5 indicates that, among boys but not girls, there is a curvilinear relation between responses to the authoritarian scale (A9) and nominations received for Lacks Initiative (LI9). The relation has been plotted in Fig.

TABLE 4.4

Nominations for Has Initiative (HI9) in Early Adolescence as a Function of Early Adolescent CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (See p. 4-28)

	R^2		Regression Model
	Boys	Girls	
1.	.1315	.1102	$HI9 = U + CM + E1$
2.	.1372	.1127	$HI9 = U + CM + A9 + E2$
3.	.1378	.1132	$HI9 = U + CM + A9 + A9^2 + E3$
4.	.1432	.1202	$HI9 = U + CM + A9 + A9^2 + C7 + E4$
5.	.1528	.1263	$HI9 = U + CM + A9 + C7 + C7A9 + E5$
6.	.1529	.1263	$HI9 = U + CM + A9 + A9^2 + C7 + C7A9 + E6$
7.	.1529	.1263	$HI9 = U + CM + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	3.19	.07	6-4	1/279	1.95	
Quadratic	7-6	1/278	.00		7-6	1/278	.00	
Authoritarian Discipline								
Linear	2-1	1/282	1.86		2-1	1/282	.79	
Quadratic	3-2	1/281	.20		3-2	1/281	.16	

TABLE 4.5

Nominations for Lacks Initiative (LI9) in Early Adolescence as a Function of CYS Authoritarian Discipline (A9) in Early Adolescence and Preadolescent JPQ Energetic Conformity (C7). Fig. 4.14, p. 4-29)

	R^2		Regression Model
	Boys	Girls	
1.	.0624	.0416	$LI9 = U + CM + E1$
2.	.0624	.0448	$LI9 = U + CM + A9 + E2$
3.	.0775	.0453	$LI9 = U + CM + A9 + A9^2 + E3$
4.	.0775	.0534	$LI9 = U + CM + A9 + A9^2 + C7 + E4$
5.	.0729	.0526	$LI9 = U + CM + A9 + C7 + C7A9 + E5$
6.	.0846	.0534	$LI9 = U + CM + A9 + A9^2 + C7 + C7A9 + E6$
7.	.0847	.0534	$LI9 = U + CM + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	2.16		6-4	1/279	.00	
Quadratic	7-6	1/278	.03		7-6	1/278	.00	
Authoritarian Discipline								
Linear	2-1	1/282	.00		2-1	1/282	.94	
Quadratic	3-2	1/281	.05		3-2	1/281	.15	

4.14 and was not as predicted. The relative increase in LI9 valuations is for the middle, not the high, scorers on Authoritarian Discipline.

Nominations for Behavior Models. - Stanine values for Behavior Model were based upon valuations for the sociometric stem, "Name three persons you would like to be like," from age-mates in both the seventh and ninth grades (BM7, BM9). Similarly, stanines for Negative Behavior Model were derived from nominations as "not like to be like" (NBM7, NBM9) directed toward each of the 288 boys and 288 girls. The multiple-regression models in Tables 4.6 and 4.7 had to represent increases in nominations at a later time (for example, BM9-BM7). To express the increase, seventh-grade scores (BM7) were transposed in the conditional model to go along with the control matrix. For example, a conditional model

$$BM9' = U + CM + BM7 + E1$$

represented the degree to which the stanine values for a later occasion were related to an earlier one, all else being equal. For example, a similar relationship between earlier and later scores holds in predicting grade point average (GPA). To test hypotheses having to do with change, successive elaborations could be formulated beginning with the conditional model in each table.

Table 4.6 sets forth tests of the hypotheses that increases in positive valuations (BM9-BM7) are a negative linear function of early adolescent authoritarianism (A9) which, in turn, should be linked with nonconformity (C7) in preadolescence. The multiple-regression analysis reveals no such relations for girls. Nevertheless, the significant quadratic interaction (C7A9) indicates the probability of a complex set of relations for Behavior Model (BM9-BM7) among boys. The curvilinear regression lines for males high (Boys-H) and for those low (Boys-L) in preadolescent conformity were plotted as Fig. 4.10 earlier in the chapter.

TABLE 4.6

Relative Increase in Nominations for Behavior Model (BM9) in Early Adolescence as a Function of CYS Authoritarian Discipline (A9) in Early Adolescence and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.10, p. 4-25)

	R^2 Boys	R^2 Girls	Regression Model
1.	.2652	.3109	$BM9 = U + CM + BM7 + E1$
2.	.2654	.3165	$BM9 = U + CM + BM7 + A9 + E2$
3.	.2671	.3169	$BM9 = U + CM + BM7 + A9 + A9^2 + E3$
4.	.2679	.3169	$BM9 = U + CM + BM7 + A9 + A9^2 + C7 + E4$
5.	.2704	.3182	$BM9 = U + CM + BM7 + A9 + C7 + C7A9 + E5$
6.	.2716	.3192	$BM9 = U + CM + BM7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.8846	.3238	$BM9 = U + CM + BM7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys Models	Boys df	Boys F	Boys p	Girls Models	Girls df	Girls F	Girls p
A9.C7 Interaction								
Linear	6-4	1/279	1.42		6-4	1/279	.94	
Quadratic	7-6	1/278	5.05	.025	7-6	1/278	1.89	
Authoritarian Discipline								
Linear	2-1	1/282	.08		2-1	1/282	2.31	
Quadratic	3-2	1/281	.65		3-2	1/281	.16	

Table 4.7 is designed to test a corollary hypothesis. Increases in valuations as a Negative Behavior Model (NBM9-NBM7) were expected to be a positive linear function of early adolescent authoritarianism (A9) which, in turn, would be linked with nonconformity in preadolescence. In this instance, there is no manifest linkage for boys, but there is one for girls. The R^2 value for inclusion of the quadratic interaction term ($C7A9^2$) in model 7 is significant when compared with the R^2 value for model 6 when computed for the girls. The plots of the curvilinear regression lines for girls high (stanines 7-9) and low (stanines 1-3) upon JPQ Energetic Conformity were shown in Fig. 4.11. As explained in the text, the relations are of a different nature than what was hypothesized. Girls who were high on preadolescent conformity (C7) and at either extreme of the authoritarian scale (A9) in early adolescence turn out to be the ones who are most frequently reported as Negative Behavior Models.

Reputation as Left Out. - Stanine values were assigned for the frequencies with which each boy and girl was named as "left out of things on purpose... make other people feel uncomfortable." Relative increases in Left Out (LO9-LO7) were expected to be related to authoritarianism (A9), particularly for the adolescents who were nonconformists (C7) in preadolescence. Table 4.8 summarizes the multiple-regression analysis. For both sexes, the F ratios are significant at the .05 level when the R^2 values for the quadratic model (line 3) and the linear model (line 2) are compared (3-2). As represented in Fig. 4.12, the curvilinear relationships between LO and A9 for boys has a form opposite to the one for girls. If the quadratic $C7.A9^2$ model 7 in Table 4.8 had fulfilled the decision rule (P at .05 or less), separate curvilinear lines for high conforming and low conforming (C7) girls would have been necessary in Fig. 4.12 on page 4-27).

TABLE 4.7

Relative Increase in Nominations for Negative Behavior Model (NBM9) in Early Adolescence as a Function of CYS Authoritarian Discipline (A9) in Early Adolescence and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.11, p. 4-25)

	R^2		Regression Model
	Boys	Girls	
1.	.2022	.2501	$NBM9 = U + CM + NBM7 + E1$
2.	.2036	.2502	$NBM9 = U + CM + NBM7 + A9 + E2$
3.	.2132	.2564	$NBM9 = U + CM + NBM7 + A9 + A9^2 + E3$
4.	.2166	.2570	$NBM9 = U + CM + NBM7 + A9 + A9^2 + C7 + E4$
5.	.2067	.2620	$NBM9 = U + CM + NBM7 + A9 + C7 + C7A9 + E5$
6.	.2167	.2648	$NBM9 = U + CM + NBM7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.2235	.2746	$NBM9 = U + CM + NBM7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.04		6-4	1/279	2.96	
Quadratic	7-6	1/278	2.43		7-6	1/278	3.76	.05
Authoritarian Discipline								
Linear	2-1	1/282	.50		2-1	1/282	.04	
Quadratic	3-2	1/281	3.43	.10	3-2	1/281	2.34	

TABLE 4.8

Relative Increase in Nominations as Left Out (L09) during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.12, p. 4-27)

	R^2		Regression Model
	Boys	Girls	
1.	.1889	.1133	$L09 = U + CM + L07 + E1$
2.	.1903	.1135	$L09 = U + CM + L07 + A9 + E2$
3.	.2011	.1265	$L09 = U + CM + L07 + A9 + A9^2 + E3$
4.	.2011	.1266	$L09 = U + CM + L07 + A9 + A9^2 + C7 + E4$
5.	.1904	.1140	$L09 = U + CM + L07 + A9 + C7 + C7A9 + E5$
6.	.2018	.1268	$L09 = U + CM + L07 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.2053	.1371	$L09 = U + CM + L07 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.24		6-4	1/279	.06	
Quadratic	7-6	1/278	1.22		7-6	1/278	3.32	.07
Authoritarian Discipline								
Linear	2-1	1/282	.49		2-1	1/282	.06	
Quadratic	3-2	1/281	3.80	.05	3-2	1/281	4.18	.05

Analyses of Self Reports on Personality and Attitude Scales

The hypothesis tested in each instance of a self report scales is that increments in elements of the alienation syndrome are dependent upon authoritarian attitudes in early adolescence which, in turn, should be linked with preadolescent conformity. Since the multiple-regression models represent change, both the control matrix and the seventh-grade vectors for the variable are included. For example, if an increase

$$SI9 - SI7 = U + CM + E1$$

then, transposing the vector of earlier measures

$$SI9 = U + CM + E1.$$

Social Inadequacy. - Table 4.9 sets forth the analyses of relative increases in scale scores for CYS Social Inadequacy (SI9-SI7). No significant relation between social inadequacy and authoritarianism appears for the 288 boys. For girls, however, the quadratic term for a main effect ($A9^2$) turns out to be significant at the .05 point. The curvilinear relationship between girls' scores for Social Inadequacy (SI9) and their early adolescent scores on an authoritarianism scale (A9) with seventh-grade SI values and covariance terms all taken into account, has been represented in Fig. 4.06 of the text (p. 4-19). Relative increase in Social Inadequacy (SI9-SI7) is greatest among girls who respond toward either extreme of the authoritarianism scale (A9) and who were high on the earlier conformity measure (C7). These relations were plotted as Fig. 4.06 in the chapter.

Criticism of Youth. - Table 4.10 records the results of a multiple-regression analysis of increases in being critical of age-mates (CY9-CY7). When the vector of earlier CY7 scores is transposed in the models, the remaining vector of early adolescenct CY9 scores represents increases in CYS Criticism of Youth. The analysis clearly shows that the increases are a positive linear function of scores in early adolescence

TABLE 4.9

Relative Increase in CYS Social Inadequacy (SI9) during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.06, p. 4-19)

	R^2		Regression Model
	Boys	Girls	
1.	.1754	.1602	$SI9 = U + CM + SI7 + E1$
2.	.1761	.1627	$SI9 = U + CM + SI7 + A9 + E2$
3.	.1775	.1765	$SI9 = U + CM + SI7 + A9 + A9^2 + E3$
4.	.1798	.1788	$SI9 = U + CM + SI7 + A9 + A9^2 + C7 + E4$
5.	.1797	.1705	$SI9 = U + CM + SI7 + A9 + C7 + C7A9 + E5$
6.	.1809	.1815	$SI9 = U + CM + SI7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.1813	.1888	$SI9 = U + CM + SI7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.37		6-4	1/279	.92	
Quadratic	7-6	1/278	.14		7-6	1/278	2.50	
Authoritarian Discipline								
Linear	2-1	1/282	.24		2-1	1/282	.84	
Quadratic	3-2	1/281	.48		3-2	1/281	4.71	.05

TABLE 4.10

Relative Increase in CYS Criticism of Youth during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.03, p. 4-25)

	R^2 Boys	R^2 Girls	Regression Model
1.	.1167	.1343	$CY9 = U + CM + CY7 + E1$
2.	.2182	.3866	$CY9 = U + CM + CY7 + A9 + E2$
3.	.2192	.2898	$CY9 = U + CM + CY7 + A9 + A9^2 + E3$
4.	.2196	.3900	$CY9 = U + CM + CY7 + A9 + A9^2 + C7 + E4$
5.	.2202	.3882	$CY9 = U + CM + CY7 + A9 + C7 + C7A9 + E5$
6.	.2223	.3928	$CY9 = U + CM + CY7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.2229	.3952	$CY9 = U + CM + CY7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys Models	Boys df	Boys F	Boys p	Girls Models	Girls df	Girls F	Girls p
A9.C7 Interaction								
Linear	6-4	1/279	.97		6-4	1/279	1.29	
Quadratic	7-6	1/278	.21		7-6	1/278	1.10	
Authoritarian Discipline								
Linear	2-1	1/282	36.61	.001	2-1	1/282	115.99	.001
Quadratic	3-2	1/281	.36		3-2	1/281	1.47	

for CYS Authoritarian Discipline (A9). For both sexes, the F ratios are at the .001 level of confidence. Regression lines, plotted in Fig. 4.03 of the chapter, reveal different slopes for the two sexes. Rate of change in CY scores in relation to A9 is greater for girls than for boys. No significant C7A9 interaction occurs for either sex.

Generalized Hostility Toward Society. - Increases in CYS Negative Orientation to Society (NOS9-NOS7) are analyzed in Table 4.11. Again, for both sexes, the increases are linearly related to A9 scores and there is no manifest interaction with antecedent C7 stanine values. Figure 4.04 in the chapter indicates that the relation of increases in NOS scores to A9 values is stronger for girls than for boys.

Measures of Anxiety. - The analysis of relative increases in scores for CMAS Anxiety (CMA9-CMA7) by multiple regression procedures requires models which represent change. In the models of Table 4.12, the CMA7 term has been transposed and CMA9 becomes the dependent variable reflecting increments in anxiety scores. For both sexes, increments in level of anxiety are a linear function of CYS Authoritarian Discipline (A9) and there is no link to earlier JPQ Energetic Conformity (C7). The corresponding linear regression lines for girls and for boys were plotted in Fig. 4.05.

A second measure of anxiety, N-N Autonomy Anxiety, has to do with "fear about being on one's own," rather than the more generalized "fear of failure." The hypothesis suggested in Fig. 4.02 (p. 4-11) is that Autonomy Anxiety (AA8) measured during the transition of a majority of subjects into adolescence is related to earlier conformity (C7) as well as to subsequent authoritarianism (A9). Thus Table 4.13 employs what might be termed an "antecedent-intervening-consequent" set of models rather than those used to represent change. Apparently, for girls only, there is a significant linear relation between this form of anxiety (AA8) and early

TABLE 4.11

Relative Increase in CYS Negative Orientation to Society (NOS9) during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent Energetic Conformity (C7). (Fig. 4.04, p. 4-17).

	R^2		Regression Model
	Boys	Girls	
1.	.2212	.1381	$NOS9 = U + CM + NOS7 + E1$
2.	.2469	.2625	$NOS9 = U + CM + NOS7 + A9 + E2$
3.	.2516	.2636	$NOS9 = U + CM + NOS7 + A9 + A9^2 + E3$
4.	.2551	.2644	$NOS9 = U + CM + NOS7 + A9 + A9^2 + C7 + E4$
5.	.2575	.2636	$NOS9 = U + CM + NOS7 + A9 + C7 + C7A9 + E5$
6.	.2602	.2645	$NOS9 = U + CM + NOS7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.2658	.2647	$NOS9 = U + CM + NOS7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	1.92		6-4	1/279	.04	
Quadratic	7-6	1/278	2.12		7-6	1/278	.08	
Authoritarian Discipline								
Linear	2-1	1/282	9.62	.005	2-1	1/282	47.57	.001
Quadratic	3-2	1/281	1.76		3-2	1/281	.42	

TABLE 4.12

Relative Increase in CMAS Anxiety (CMAS) during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.05, p. 4-19)

	R^2		Regression Model
	Boys	Girls	
1.	.2978	.2902	$CMA9 = U + CM + CMA7 + E1$
2.	.3253	.3109	$CMA9 = U + CM + CMA7 + A9 + E2$
3.	.3280	.3110	$CMA9 = U + CM + CMA7 + A9 + A9^2 + E3$
4.	.3293	.3110	$CMA9 = U + CM + CMA7 + A9 + A9^2 + C7 + E4$
5.	.3268	.3141	$CMA9 = U + CM + CMA7 + A9 + C7 + C7A9 + E5$
6.	.3293	.3146	$CMA9 = U + CM + CMA7 + A9 + A9^2 + C7 + C7A9 + E6$
7.	.3302	.3149	$CMA9 = U + CM + CMA7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.00		6-4	1/279	1.47	
Quadratic	7-6	1/278	.37		7-6	1/278	.12	
Authoritarian Discipline								
Linear	2-1	1/282	11.49	.001	2-1	1/282	8.43	.005
Quadratic	3-2	1/281	1.13		3-2	1/281	.04	

TABLE 4.13

N-N Autonomy Anxiety (AAS) as a Function of Antecedent JPQ Energetic Conformity (C7) and Subsequent CYS Authoritarian Discipline (A9). (See p. 4-18)

	R^2		Regression Model
	Boys	Girls	
1.	.0672	.0087	$AA8 = U + CM + E1$
2.	.0746	.0266	$AA8 = U + CM + A9 + E2$
3.	.0747	.0272	$AA8 = U + CM + A9 + A9^2 + E3$
4.	.0748	.0319	$AA8 = U + CM + A9 + A9^2 + C7 + E4$
5.	.0772	.0316	$AA8 = U + CM + A9 + C7 + C7A9 + E5$
6.	.0775	.0320	$AA8 = U + CM + A9 + A9^2 + C7 + C7A9 + E6$
7.	.0816	.0361	$AA8 = U + CM + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.82		6-4	1/279	.03	
Quadratic	7-6	1/278	1.24		7-6	1/278	1.18	
Authoritarian Discipline								
Linear	2-1	1/282	2.26		2-1	1/282	5.18	.025
Quadratic	3-2	1/281	.03		3-2	1/281	.17	

adolescent authoritarianism (A9). This type of anxiety among girls increases with degree of Authoritarian Discipline.

Level of Adjustment. - The analysis for increases in CYS Personal Maladjustment (PM9-PM7) follows the pattern for measures of change. Table 4.14 demonstrates that probably a linear relation holds for girls between increments and early adolescent authoritarianism (A9). The probability is slightly above .05 for boys. No interactions or quadratic terms are significant. The regression lines for both sexes were plotted as Fig. 4.07.

TABLE 4.14

Relative Increase in CYS Personal Maladjustment (PM9) during Early Adolescence as a Function of Concomitant CYS Authoritarian Discipline (A9) and Preadolescent JPQ Energetic Conformity (C7). (Fig. 4.07, p. 4-21)

	R^2		Regression Model
	Boys	Girls	
1.	.2099	.1039	$PM9 = U + CM + PM7 + E1$
2.	.2197	.1272	$PM9 = U + CM + PM7 + A9 + E2$
3.	.2200	.1272	$PM9 = U + CM + PM7 + A9 + A9^2 + E3$
4.	.2206	.1322	$PM9 = U + CM + PM7 + A9 + A9^2 + C7 + E4$
5.	.2210	.1328	$PM9 = U + CM + PM7 + A9 + C7 + C7A9 + E5$
6.	.2211	.1329	$PM9 = U + CM + PM7 + A9 + A9^2 + C7A9 + E6$
7.	.2219	.1330	$PM9 = U + CM + PM7 + A9 + A9^2 + C7 + C7A9 + C7A9^2 + E7$

Source of Variance	Boys				Girls			
	Models	df	F	p	Models	df	F	p
A9.C7 Interaction								
Linear	6-4	1/279	.17		6-4	1/279	.14	
Quadratic	7-6	1/278	.28		7-6	1/278	.03	
Authoritarian Discipline								
Linear	2-1	1/282	3.54	.06	2-1	1/282	7.53	.01
Quadratic	3-2	1/281	.11		3-2	1/281	.00	

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CHAPTER V

ANALYSES OF REPEATED OBSERVATIONS

Assumptions, concepts, and principles emergent from the Human Talent Research Program (HTRP) and relevant theoretical and research literature could be drawn together in order to provide a meaningful frame of reference not only for the presentation and interpretation of data gathered in the repeated observations characteristic of a longitudinal naturalistic inquiry but also to make a transition into the final report on talented behavior in senior high school years (McGuire, Jennings, Murphy & Whiteside, 1968). Circumstances permitted a revision of this concluding chapter after completion of the former manuscript. The revision, however, has the same tables as those originally planned for Chapter V. Before consideration of the repeated observations, a concise statement of an emergent frame of reference for the study of human development and various forms of intelligent behavior is undertaken. The section upon analyses and interpretations of longitudinal data is followed by a closing section in which selections from the current literature on the educational encounter and upon changing concepts of educational psychology are evaluated in the light of our HTRP experiences and findings.

An Emergent Frame of Reference

Consider the shades of meaning conveyed by the Latin phrases _non capax mentis_ (not intellectually capable) and _non compos mentis_ (not mentally composed) where the added dimension is the absence of smooth, effective functioning of the cognitive processes. The notion of smoothly functioning sets of capabilities developed by biologically competent (biocompetent) and relatively intact (biointact) human beings underlies emergent concepts of both intelligent and talented behavior. A young person evaluated as being talented in the physical sciences and mathematics, for example, probably has acquired a repertoire of response capabilities through experiences where skills are mastered and perceived incongruities are resolved. He also has learned considerable response flexibility and impulse control in order to adapt effectively when he encounters unique constellations of conditions and events.

What are the consequences of the approach to an area of inquiry when "intelligence" has been regarded as if it were a muscle to be exercised in order "to grow," that is, as an entity instead of being an attribute observed in the form of highly functional or adaptive behavior? In a provocative article upon "Intelligent Testing," Alexander Wesman (1968) has asked whether or not we have become so preoccupied with the reification of intelligence as an entity that we have failed to attend to at least four critical issues confronting us. After concise discussions of the four issues, he recommends "recognition that what we are measuring is what the individual has learned, and composing our tests to appraise relevant previous learnings, will yield the most useful information" (p. 274). Anne Anastasi (1967) has suggested that psychological testing be related meaningfully to theory so that misconceptions such as "the popular notion of the fixity of the IQ" and "the assumption that tests are designed to measure some mysterious entity known as 'innate capacity'" can be countered effectively.

In the Laboratory of Human Behavior at Texas, our interest in cognitive behavior, particularly central processes guiding intelligent behavior, began with the development of a Vigotsky-type block-sorting test of abstracting capacities independent of language usage. To arrive at solutions for each of the several forms in which the instrument could be presented, the respondents had to attain and behave in terms of concepts of color, shape, and height in a number of combinations with "helps" from the examiner upon request. The frame of reference for differentiating among forms of intelligent, talented, and creative behavior in contrast to stimulus-response conceptions began with this naturalistic experiment (Findlay & McGuire, 1957), a research report so far seemingly appreciated only by McCandless[1] (1967, pp. 314-317).

To be exact, the dyadic interaction model stems back to Sears' A.P.A. Presidential Address (1951), Tolman's "A Psychological Model" (1951), and McGuire's unpublished paper on "Toward the Study of Human Learning."[2] The paper was prepared for a symposium on "Can the Laws of Learning Be Applied to the Classroom?" at Northwestern University (held in May, 1968) where McGuire, Hilgard, and Thorndike responded with critical analyses and alternative proposals to papers prepared by Spence, Melton and Underwood which subsequently were published in the Harvard Educational Review (1959). Moreover, an often-disregarded book by C. H. Judd, which has contributions from R. W. Tyler among others, Education as Cultivation of the Higher Mental Processes (1936), with "learning as organization of experience" (pp. 138-166), and its "demand for a new type of educational psychology" (pp. 167-201) had left a lasting impression upon the principal investigator. The foregoing influences together with intuitive ideas derived from the HTRP data are reflected in Rowland and McGuire's Emergent View of Intelligent Behavior: Men and Their Ideas (1968a) and their From Interaction to Intelligent Behavior (1968b). The first book collects articles being published by Psychology in the Schools commencing with the January issue of 1968 (Piaget, Berlyne, White, Bruner), as referenced in Chapter II. The chapters on "Central Process Theorists," Hunt's work on "Experience and Early Childhood Education," and our "Educational Psychology as Behavioral Science" are scheduled for 1969.

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[1] In his discussion of culture-free or culture-fair "tests of intelligence," McCandless uses the finding to point out, "Contrary to the expectations of advocates of the culture-free intelligence test, the middle-class children did better on the nonverbal test than the lower-class children."

[2] The principal investigator (CMcG) encountered both men in 1948 at Chicago during the period he was editing the proceedings of an Interuniversity Conference on Child Development for the March-June issue of Child Development (1948, 19, 5-126) and preparing a revised rationale and program of studies in Human Development (McGuire & Havighurst, 1948). At that time, Sears was considering a move to Harvard and McGuire to Texas. Both of us were quite aware of the monadic tradition of American Psychology since the time of William James. For a commitment to human development and educational psychology, however, explicit recognition should be given to the dyadic and/or polyadic nature of developmental influences and factors operating in ongoing behavior, particularly in the educational encounter. During 1949-50, Tolman and Sears (who moved from Iowa to Harvard) worked with Parsons and Shils (1951) and personnel in the new Department of Social Relations upon the well-known Toward a General Theory of Action. Whereas Sears "exteriorized" the dyadic variables in a neo-behavioristic frame of reference, Tolman tended to put his "intervening variables," inclusive of "belief-value matrices," into cognitive maps which he sometimes termed "schematic sowbugs."

From a Heuristic to a Dynamic Open Pattern Model

Figure 5.01, "Dyadic Interaction Model for the Study of Human Development and Behavior," represents Figure 2.02 in Chapter II. The emergent heuristic device had evolved from an earlier "schematic diagram of human learning" employed by McGuire (1958) in "Toward the Study of Human Learning," his unpublished contribution to a Symposium held May 17, 1958, that was financed by a grant for cross-disciplinary development from the Carnegie Fund to the Department of Psychology and the School of Education at Northwestern University (Spence, Melton, & Underwood, 1959). Excerpts from the paper written during the initial HTRP years have been edited to give substance to the theoretical orientation presented in Chapter II (pp. 2-38 to 2-44) with a focus upon the cultivation of talented behavior in secondary school settings. The developmental work upon the original

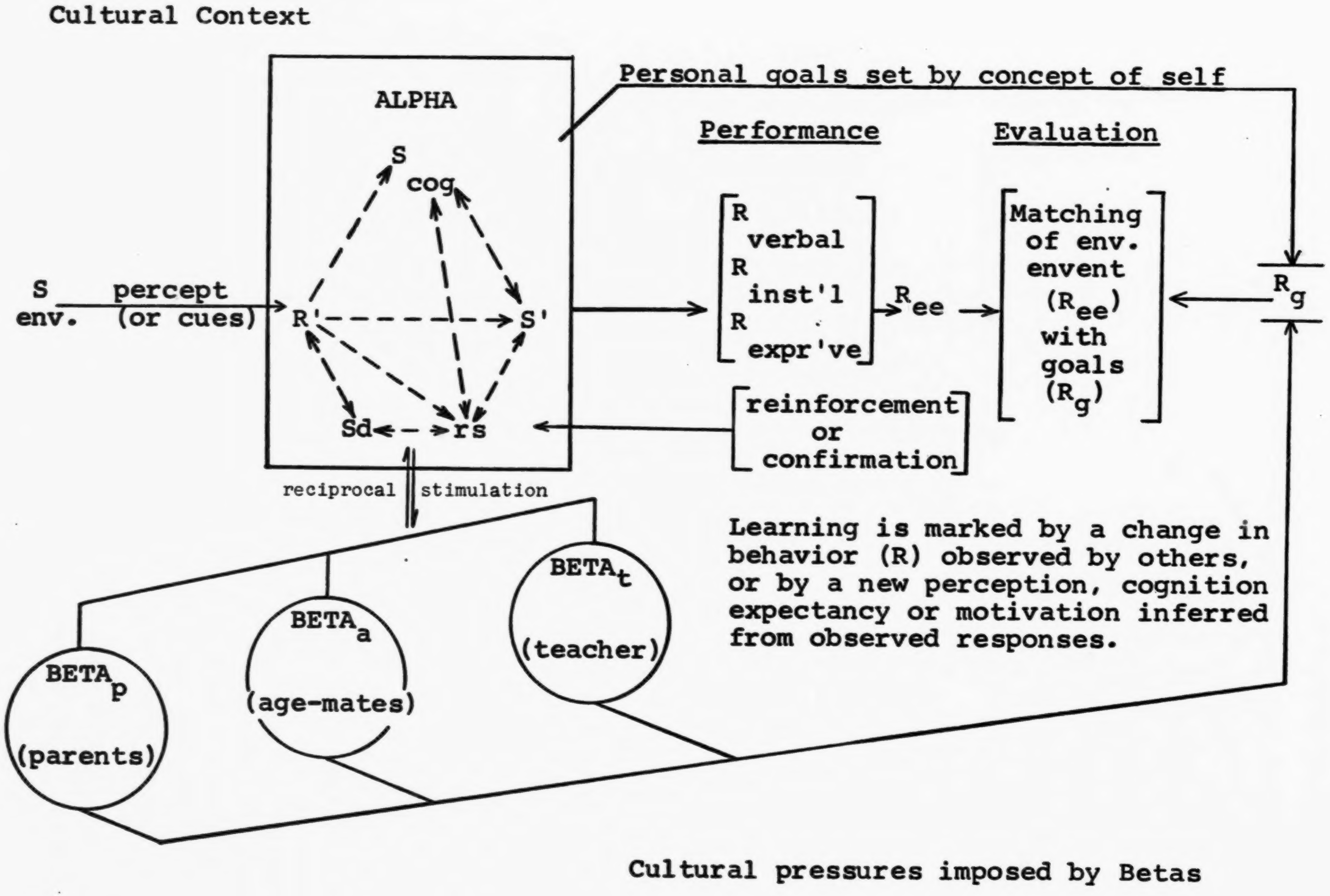
Cultural Context
ALPHA
S
cog
S
env.
percept
(or cues)
R'
S'
Sd
rs
reciprocal
stimulation
Personal goals set by concept of self
Performance
Evaluation
R verbal
R inst'l
R expr've
R ee
Matching of env. envent (R ee) with goals (R g)
R g
reinforcement or confirmation
Learning is marked by a change in behavior (R) observed by others, or by a new perception, cognition expectancy or motivation inferred from observed responses.
BETA t
(teacher)
BETA a
(age-mates)
BETA p
(parents)
Cultural pressures imposed by Betas

Figure 5.01. Dyadic interaction model for the study of human development and behavior.

theory may be found in the Behavioral Science Research Memoranda prepared and edited by McGuire for the Research and Development Center for Teacher Education and deposited with the Educational Resources Information Center, the ERIC system established and maintained by the U. S. Office of Education.[3] Analyses of relevant research and publications and an in-depth analysis of converging evidence for central processes guiding intelligent behavior has been made available in prepublication volumes of books by Rowland and McGuire; namely, a collection of original articles published and accepted for publication collected in Emergent Views of Intelligent Behavior (1968a) and From Interaction to Intelligent Behavior (1968b).

The original schematic diagram began as a heuristic device, a set of pegs upon which to hand and organize intuitive conceptions of observed phenomena.[4] Nevertheless, the scholarly inquiry recorded above and analyses of HTRP data to this point suggest that it is becoming a dynamic open pattern model[5] applicable to a number of aspects of human development, particularly the educational encounter.

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[3] Consult Research in Education (RIE), a monthly abstract journal published by ERIC. Information on memoranda and certain working papers prepared by McGuire and his associates begins in RIE, 1968, Vol. 3, No. 4.

[4] The word "heuristic" not only stems from the Greek heuriskein "to discover," but also is akin to Old Celtic (Irish) fuar, "I have found." As an adjective, the English word is applicable in the sense of "serving to guide, discover, or reveal." In scientific usage and computer practice, however, there are limits to "heuristic" used as a noun to designate either (1) the study or practice of heuristic procedures, or (2) a heuristic argument. In general, a heuristic program simulates an intuition, often trial-and-error routine, an approach which can encourage further experimentation or investigation leading to actual learning. In contrast, a computer algorithm is a fixed step-by-step procedure for accomplishing a given result. Insofar as a heuristic device becomes a logically consistent network of assumptions, concepts, and organizing principles from which testable hypotheses follow, however, the original heuristic schema approaches a state of theory.

[5] In a pattern model, according to Kaplan (1964), "something is explained when it is so related to a set of other elements that together they constitute a

Assumptions, Concepts and Organizing Principles

Assumption: In a biointact individual, the cortical substrate has a preference for order; that is, an organization or set of central processes which emerge, guide, and evaluate behavior as a consequence of experiences acquired when discrepancies are encountered in one or a combination of an organism's three interacting environments--genetic, internal, or external (Muller, Little, & Synder, 1947, p. 100).

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unified system." To understand something, we identify it as a specific part in an organized whole. The essential element appears to be a sense of familiarity, a consequence of learning by the organization of experience (Judd, 1936, pp. 165-170). Kaplan (1964, p. 333) asserts "the known is identified with something known... in terms of its place in a network of relations." Strictly speaking, a model in a theoretical science is a convenient fiction representing the state of affairs of phenomena, some of which are observable, to test hypotheses derived by deductive reasoning or "if ..., so ..." formulations. In operational terms, a behavioral science explanation is functional in so far as logically-consistent "means-end" statements are directed toward the maintenance of ultimate values; namely, survival in the case of most organisms, and self-extension, order and meaning, plus a system of security or risks among human beings. Moreover, in the study of man, explanations have to possess time-binding qualities--the past can be brought into the present, where a state of affairs or events can be observed and reformulated, and be projected into the future (permitting tests of truth value; i.e., verifiable predictions). "Dynamic openness," according to Kaplan (1964, pp. 68-70) exists in the construction of a scientific system when it accomodates "the leading edge of scientific terms, their permanent possibility of change in meaning." The dyadic interaction model consists of "empty symbols." For example, Figure 5.01 employs Sears' **1951** symbol, S_{cog}, which may be changed from the designation of "habit-family hierarchy," to "cognitive structure," to "cognitive schemata," to "ego structure," or to "personal constructs." Similarly, "expectancies of the supportive or nonsupportive responses of Betas, rs, can be regarded as "attitudes." Then by a simple linkage, $S_d \rightleftharpoons$ rs, one may denote a "motive" or "cathexis." "Empty symbols," which do not carry a specific meaning, give a model explanatory power and versatility.

(1) Reciprocal-stimulation between Alpha and Beta(s) underlies the sequence of observed changes in both "cue-dependent" and "intelligent behavior" (the latter using repertoires of labels, skills, concepts, and principles according to changes in the behavior setting which requires adaptive response patterns).

(2) Developmental processes. The processes of development involves the patterned growth, differentiation, and integration or coordination of body systems. Three interacting environments influence development; namely, (a) the morphogenic or gene-controlled, (b) the internal or neuro-endocrine, and (c) the external or nutritional-social-psychological environments. Each operates through the life cycle to bring about phases of maturation; namely, embryo (fetus), infancy, childhood, adolescence, adulthood, later maturity.

(3) Time is not a variable of major concern in the study of human development but provides a background against which sequences of transformations can be portrayed.

(4) Learning occurs when there is some discontinuity in the continuity of Alpha's ongoing experience. Teaching, the reciprocal of learning, requires the planned introduction of discontinuity.

(5) Transition from infant organism to human being. Three essential steps mark the transition and each lays a foundation for subsequent kinds of learned behavior and emotional reactivity. Briefly stated (McGuire, 1960b), they are:

a. the establishment of child-mother and additional self-other relationships which create in the learner expectancies of supportive or non-supportive responses to one's behavior under varying conditions by cultural agents--first in the family, then age-mates, other adults;

b. the acquisition of a means of communication, usually a language, which can guide, interpret, and control one's own and other persons' thoughts, feelings, and actions, binding past, present, and future;

c. the emergence of motivations other than immediate gratification (reward) and deprivation (punishment) by learning to value approval and to avoid failure and disapproval (social anxiety), to be concerned about being accepted or avoided (ego-involvement), and to maintain self-respect and self-esteem (identity)--responding to shame and guilt.

Our emotions are the price we pay for the transformation from immature organisms into human beings within a social system. Human being, doing, relating, and valuing may be based upon feeling, dependencies upon Betas, reality testing, and/or Alpha's openness to experience--particularly when discontinuities and incongruities are encountered.

(6) Nature of concepts. Concept formation is ontogenetic and the principles which relate concepts also depend upon the nature of an "interaction, experience, central process, adaptive behavior" sequence. That is, a dyadic interaction model can be used to study both teaching and learning, complementary facets of a dyadic interaction process (depicted in Figure 5.01, page 5-5) which ideally, requires continuing reciprocal stimulation between Alpha (the learner) and the Betas or cultural agents in the teaching-learning context.[6] This statement should be taken as a calculated contradiction of

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[6] The intention is to link "concept formation," a phenomenon all too often studied in isolation, with "the system of linguistic competence that underlies all behavior" (Chomsky, 1968). According to the model in Figure 5.01, elaborated in Chapters I and II, the study of concept formation can be fitted into the dyadic model wherein central processes are developed as a consequence of reciprocal stimulation in Alpha-Beta interactions, much of one's expectations are aroused and behavior is guided by language, and the process of evaluation becomes a part of ongoing behavior. Learning a concept, understanding a particular phenomenon in its context, involves a "knowing process" whereby a construction of the generali-

the thesis advanced by Gage in his chapter upon "Theories of Teaching" in the valuable 63rd NSSE yearbook, Theories of Learning and Instruction, edited by Hilgard (1964, pp. 268-285). Gage's thesis embodies a "basic distinction between theories of learning and theories of teaching." Consequently, he tends to by-pass the notion "that teaching can be viewed as the obverse, or 'mirror image,' of learning and therefore has components corresponding to those of learning" (p. 275). Subsequently, Gage elects to focus upon "the cognitive restructuring approach" as against "the conditioning paradigm" and by implication, the application of training research to education (Glaser, 1964).[7]

Analyses and Interpretations of Longitudinal Data

The HTRP was planned as a longitudinal study of boys and girls who were in the seventh-grade classrooms of four communities in the school year 1957-58

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able aspects of the dynamic knower-known relation becomes a part of the tightly-interrelated and hierarchically-ordered network of active schemes in the central processes guiding intelligent behavior.

[7] The dyadic interaction model would permit one to deduce that teaching involves the controlled introduction of discontinuity into the ongoing experiences of a learner (or learners). The experience of discontinuity may be introduced by a means of exposition or by setting up conditions and providing epistemic (knowledge-ordering) organizers for discovery learning to take place. The experience of discontinuity forces the learner to re-examine his "knowing" constructions (schemes, frames of reference, cognitive structures) by which he is ordering the world and to alter or modify them so as to reestablish continuity by what Gage terms "cognitive restructuring" or by what Piaget terms "equilibration," at a new and different level of accommodation to discontinuity in order to reestablish assimilation of ongoing experience. This principle of continuity-discontinuity underlies and is implicit in teaching-learning facets of the educational encounter to permit the ongoing "dynamic equilibrium" (Gerard, 1940) of living and learning.

(McGuire, 1961a). The data took the form of repeated observations on each of the same attributes of the same individuals on a number of different occasions, usually under the same conditions. In Chapter IV, the seventh-grade preadolescent (PA) observations could be regarded as pretests, the inevitable human encounter of each boy and girl with the changes in body image, body chemistry, and ego function (**Sherif** & Cantril, 1947) during pubescence could be looked upon as a form of intervention into developmental patterns, and the ninth-grade early-adolescent (EA) observations could be recorded as posttests.

Nature of the Repeated Observations in the HTRP

Repeated observations in a longitudinal study introduce research problems. Interventions such as the concomitants of pubescent changes upset what Mather (1947, p. 109) termed the relative "growth formula" and what Fisher (1946, pp. 24, 140) designated "the relative growth rate." Moreover, in 1924, Thorndike noted that there is a negative correlation between an initial score on a variable and any subsequent change. This is the phenomenon of regression toward the mean, or the over-correction and under-correction dilemma; that is, individuals who obtain a high score on an initial measurement can be expected to score lower upon remeasurement, all else being equal.[8] Not until the HTRP data were gathered, did a book on Problems of Measuring Change, with twelve papers contributed for a conference then edited by C. W. Harris (1963), become available. The repeated observations are scores or values on comparable scales or ordered metrics (McGuire &

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[8] Some data upon short term interventions and for changes in the four different communities showed a tendency for those whose initial scores were low on a pretest to show gains on the posttests not present for individuals higher upon the pretests. Since graphs from multiple regression analyses carried out as described in Appendix B, "Methodology," tended to show a minimal and often inconclusive results, these analyses have not been included in the report.

Fruchter, 1967) of the same HTRP subjects for the seventh-grade PA and the ninth-grade EA observations. For a large proportion of the subjects, both male and female, pubescent changes catalyzed developmental transformations which intervened between the PA and EA observations.

Statistical considerations.- Since no "change scores" or "difference values" enter into the data to be analyzed, the repeated observations apparently are not subject to the three dilemmas described by Bereiter (in Harris, 1965, pp. 3-20) beyond the possibility that the same instruments (or the "comparable" forms furnished by test publishers) were not measuring the same phenomena at the PA and the EA administrations. Aware of this possibility we went ahead with the analysis as planned on the basis of earlier experiences which, for the principal investigator, had included working with Thurstone and his people on a testing program for Sears, Roebuck & Co. as well as E. A. Haggard at Chicago upon the development of ANOVA models for identifying sources of variation in repeated measurements. Much of the theory of statistics learned from earlier editions of Yule & Kendall (1950) as well as Kendall's two volumes on "advanced theory" (1947) remained viable. Snedecor (1947) and Mather (1947), with frequent references back to Fisher (1946), proved to be valuable references along with literature on mathematical statistics, largely in Biometrika and Psychometrika as well as books by Mood, Rao, Kempthorne, and Dixon and Massey not included in the references. Factor-analytic rationale had been acquired from Holzinger (1942, 1944) who had a broad grasp of all approaches as shown in the Holzinger & Harman book (1941) which is the antecedent of Harman's latest revised edition of Modern Factor Analysis (1967). Moreover, Harris had been at Chicago at the same time and his publications (for example, 1956 and 1963, pp. 138-154), together with a large notebook filled with his working papers sent from Wisconsin between those two dates, also have been consulted frequently. Finally, Jennings (1965) had been an original member of the HTRP group who occasionally published what he and Veldman (1963) had "hammered out" at lunch during well-remembered and often-heated discussions into which the remainder of us, particularly the individuals whose work is represented in Appendices C (Dissertation Abstracts) and D (Bibliography of HTRP Publications, 1957-1967), only occasionally ventured to intrude!

Literature on repeated observations in longitudinal research.- Unfortunately, the long-awaited book on Stability and Change in Human Character by B. S. Bloom (1964), with its three versions of an "Overlap Hypothesis" (which would predict the degree of overlap between two sets of measurements), turned out not to be irrelevant to the HTRP data with its "years of transformation" orientation. At the Fels Research Institute in Yellow Springs, Ohio, a longitudinal study of human development had been initiated in 1929 and enrolled 89 individuals from 63 different families (45 girls and 44 boys) for observation and study from 1929 to 1939. The sample turned out to be largely upper-middle class, quite unlike the HTRP population whose family backgrounds are depicted in Chapter III. The Moss & Kagan book, which summarizes the changes indicated in their title Birth to Maturity (1962), focused upon selected patterns of development. In general, they demonstrate that, with increasing age, some attributes begin to stabilize and persist into adulthood. Much to our dismay they did not consider or include data to study the several kinds of transformations postulated in the HTRP research. Despite the discrepancies between the populations, we would predict (on the basis of our Chapters III and IV) some transformations in any population from the PA to EA years. Someone should return to the Fels data with the transformation hypothesis in mind, assuming that shifts in body image and age-mate, parental, and institutional expectations take place when evidences of pubescent changes become visible among age-males, regardless of family background.

Reliability and validity of measures.- When instruments were selected as operational measures of variables to be studied in the HTRP, the faculty group (which included Fruchter) had been oriented to Guilford's formulations (1954) about the necessity of having reliable and validated measures. By the time of the initial report (McGuire & Associates, 1960), however, the research team had begun to realize that test construction and multivariable research projects do not have the same expectations. The first confirmation of this point of view had appeared in Loewinger's monograph (1957) wherein, after an overview of various structural models and the problems they involve, she concludes that the time has come to dispose of classical concepts of validity and to replace them with a concept in keeping with modern science; that is, "construct validity." She asserted that tests should be based on a theory of test behavior which is to be related to a theory of behavior in nontest situations, an approach recently emphasized by Anastasi (1967). In the meantime, Cattell (1964) has proposed what he terms "a more basic set of concepts" of validity and reliability which places emphasis upon the consistency of and control of error sources in measurements and introduces the "data box" (which reappears in his 1966 Handbook as a way of ordering possible relational systems) as a schema for the derivation of forms of consistency. The change in outlook had been recognized by Paul Horst in his chapter, "Multivariant Models for Evaluating Change" (Harris, 1963, pp. 104-121). He introduces the notion of a multi-dimensional data matrix as a model wherein the instrument and occasion categories are the basic concepts involved in the theory of reliability, and where the occasions correspond to consistency or stability over time. He believes "that the traditional concepts and constructs of reliability theory will become assimilated as part of the general multidimensional data matrix model in which two of the dimensions are instruments and occasions, respectively" (p. 105). Recognition of the essential differences between the instruments and occasion categories should lead to "a thorough and drastic remodeling of current reliability theory." In the same book (Harris, 1963, pp. 212-242), Donald Campbell, in a chapter "From Description to Experimentation," draws a distinction between internal validity (does the intervention make a difference?) and external validity (are the outcomes generalizable?) A recent volume, Problems in Human Assessment edited by Jackson & Messick (1967), not only has well-selected sets of readings on topics and subtopics, but also a great deal of wisdom in the editorial introductions.

Nature of Repeated Observations

Table 5.01 or A.01 (moved to Appendix A to reduce the number of pages in this chapter) summarizes the data gathered from 1957-58 (grade seven) to 1960-61 (grade ten) on fifteen pages (pp. A-17 to A-31) for the population of boys and girls at the four communities as shown on Table 3.5 of Chapter III (p. 3-24). For each designated variables, described in Appendix A, three kinds of information are given. The first entry is the master file number (MFN) to locate the observed values, scores, or categorizations on IBM cards which have been stored as part of the HTRP data bank for re-checking analyses. The coded data bank also supplies materials for the education of research personnel, for persons who want to test either theoretically-derived or empirical hypotheses, and to permit subsequent studies of HTRP subjects should the necessary funds become available for a follow-up study similar to the very important monograph recently published by Skeels (1966). The second entry is the form of the instrument, when applicable, and the third (N) is the number of individuals for whom observations are available at each administration. Table 5.01 (or A.01, pp. A-17 to A-31), together with the description of variables in Appendix A, may be compared with the account of "Types of Tests in Project Talent" supplied by Dailey and Shaycroft (1961). The

TABLE 5.01

Summary of Data Gathered in the Human Talent Research Program from Grade VII (1957-58) to Grade X (1960-61) with Master File Numbers (MFN), Form of Instrument, and Number of Subjects (N).

	Designation of Variable		VII 1957-58	VIII 1958-59	IX 1959-60	X 1960-61
001	GPA Teacher Evaluation	MFN	101	181	372	427
		Form				
		N		1182	992	1098
001a	English Grade				393	797
					1284	941
001b	Math Grade				394	798
					1245	798
001c	Social Sciences Grade				395	799
					1059	403
001d	Science Grade				393	800
					983	773
002	CAT Reading Total		4	153	215	424
			JH-X	JH-W	ADY	
			1450	1369	1210	183
002a	CAT Reading Vocabulary		2	151	214	424
			JH-X	JH-W	ADY	
			1450	1369	1030	183
002b	CAT Reading Comprehension		3	152	213	424
			JH-X	JH-W	ADY	
			1450	1369	1180	183

	Designation of Variable		VII	VIII	IX	X
003	CAT Language Total	MFN	7	156	218	424
		Form	JH-X	JH-W	ADY	
		N	1477	1302	1085	183
003a	CAT Mechanics of English		5	154	216	424
			JH-X	JH-W	ADY	
			1477	1305	1111	183
003b	CAT Spelling		6	155	217	424
			JH-X	JH-W	ADY	
			1477	1302	1138	183
004	CAT Arithmetic Total		10	159	221	424
			JH-X	JH-W	ADY	
			1446	1394	1162	181
004a	CAT Arithmetic Fundamentals		9	158	220	424
			JH-X	JH-W	ADY	
			1446	1394	1137	181
004b	CAT Arithmetic Reasoning		8	157	219	424
			JH-X	JH-W	ADY	
			1446	1394	1137	181
005	STEP Mathematics			165	211	
					3B	
				1073	971	
006	STEP Science		12	164	209	
			3A	3B	3A	
			1470	1301	1149	
007	STEP Social Studies		11	162	210	
			3A	3B	3A	
			1494	1361	1173	
010	Index of Peer Status		64	191	859	
			1318	602	1239	

	Designation of Variable		VII	VIII	IX	X
011	Peer Nomination:	MFN	70			
	Wheels	Form				
		N	1646			
012	Peer Nomination:		71		364	
	Brains				I 13	
			1646		1250	
013	Peer Nomination:		74			
	Average Ones					
			1646			
014	Peer Nomination:		75		346	
	Quiet Ones				I 7	
			1646		1250	
015	Peer Nomination:		76			
	Wild Ones					
			1629			
016	Peer Nomination:		77		348	
	Left Out				I 9	
			1646		1250	
017	Peer Nomination:		89		340	
	Behavior Model				I 1	
			1425		1250	
018	Peer Nomination:		82		356	
	Academic Model				I 15	
			1426		1250	
019	Peer Nomination:		85			
	Active					
			1426			
020	Peer Nomination:		86			
	Passive					
			1426			

	Designation of Variable		VII	VIII	IX	X
021	Peer Nomination:	MFN	98			
	Impulsive	Form				
		N	1425			
022	Peer Nomination:		99			
	Affective Neutral					
			1425			
023	Peer Nomination:		95		350	
	Adult Oriented				I 11	
			1425		1250	
024	Peer Nomination:		96			
	Peer Orieted					
			1425			
025	Peer Nomination:		97			
	Independent					
			1425			
026	Peer Nomination:		72		244	
	Imaginative				I 5	
			1629		1250	
027	Peer Nomination:		73			
	Daydreamer					
			1629			
028	Peer Nomination:		94			
	Actor					
			1425			
029	Peer Nomination:		91			
	Artist					
			1425			
030	Peer Nomination:		92			
	Athletic					
			1425			

	Designation of Variable		VII	VIII	IX	X
031	Peer Nomination: Math Ability	MFN	93		342	
		Form			I 3	
		N	1425		1250	
032	Peer Nomination: Mechanical		79			
			1426			
033	Peer Nomination: Musical		78			
			1426			
034	Peer Nomination: Science Ability		144			
035	Peer Nomination: Verbal		80		352	
					II 1	
			1426		1250	
036	Peer Nomination: Hidden Talent		81		354	
					II 3	
			1426		1250	
037	Peer Nomination: Party With		84		360	
					II 9	
			1426		1250	
038	Peer Nomination: Not Party With		148		361	
					II 10	
039	Peer Nomination: Self-Behavior		68			
			1078			
040	Peer Nomination: Others-Behavior		69			
			1041			

	Designation of Variable		VII	VIII	IX	X
041	Peer Nomination:	MFN	83		358	
	Neagative Academic Model	Form			II 7	
		N	1426		1250	
042	Peer Nomination:		88			
	Negative Personal Model					
			1426			
043	Peer Nomination:		90		341	
	Negative Behavior Model				I 2	
			1425		1250	
044	Peer Nomination:			176		
	Amoral			P10		
				1420		
045	Peer Nomination:			177		
	Expedient			P11		
				1420		
046	Peer Nomination:			178		
	Conforming			P12		
				1420		
047	Peer Nomination:			179		
	Conscientious			P13		
				1420		
048	Peer Nomination:			180		
	Rational Altruistic			P14		
				1420		
049	Peer Nomination:			182	343	
	Gets By			P1	I4	
				1420	1250	
050	Peer Nomination:			183	345	
	Enjoys Everything			P2	I6	
				1420	1250	

	Designation of Variable		VII	VIII	IX	X
051	Peer Nomination:	MFN		184		
	Desires Approval	Form		P3		
		N		1420		
052	Peer Nomination:			185	347	
	Self-Confident			P4	I8	
				1420	1250	
053	Peer Nomination:			186	349	
	Shows Initiative			P5	I10	
				1420	1250	
054	Peer Nomination:			187	351	
	Lacks Initiative			P6	I12	
				1420	1250	
055	Peer Nomination:			188	353	
	Dislikes School			P7	II2	
				1420	1250	
056	Peer Nomination:			189		
	Likes School			P8		
				1420		
057	Peer Nomination:			190	357	
	Fears Failure			P9	II6	
				1420	1250	
058	Peer Nomination:				355	
	Values Learning				II4	
					1250	
059	Peer Nomination:				359	
	Works Effectively				II8	
					1250	
060	Peer Nomination:				363	
	Seeks Recognition				II11	
					1250	

	Designation of Variable		VII	VIII	IX	X
061	Peer Nomination:	MFN			363	
	Overcomes Difficulty	Form			II12	
		N			1250	
062	Peer Nomination:				365	
	Achieved Results				II14	
					1250	
063	Peer Nomination:				366	
	Enjoys Work				II15	
					1250	
074a	CTMM Mental Function		1		212	419
			1957 SF.JH		1957 SF.SH	
			1417		847	327
075	STEP Listening		13	163	225	
			1957 3A	3B	2A	
			1471	1357	992	
078	DAT Abstract Reasoning			160		408
				A		
				508		320
079	DAT Space Relations			161		409
				A		
				509		322
080	DAT Mechanical Reasoning		143			410
			A			
			1577			313
081	DAT Clerical Speed & Accuracy		142			411
			A			
			1581			314
082	Gestalt Transformation		16		279	
			1653		1173	

	Designation of Variable		VII	VIII	IX	X
083	Consequences	MFN	24		283	
		Form				
		N	1448		1298	
084	Unusual Uses		22		284	
			1484		1171	
085	Common Situations		23		282	
					SH 1, 5, 2	
			1435		1263	
086	Rhymes		21			
			1487			
087	Seeing Problems		20		285	
					SH 1, 5, 2	
			1466		1169	
088	Gestalt Completion		17			
			1469			
089	Mutilated Words		18		280	
			1442		1243	
090	Short Words		14		281	
			1470		1242	
091	Dotting		58			
			1443			
092	DRT-Discrimination Reaction Time		61			
			1420			

	Designation of Variable		VII	VIII	IX	X
094	JPQ-1 Emotional Sensitivity vs. Toughness	MFN	39		267	
		Form			BD5	
		N	1453		1264	
095	JPQ-2 Neurotic Tension vs. Autonomic Relaxation		40			
			1454			
096	JPQ-3 Neurotic, Emotionality vs. Stability		41			
			1454			
097	JPQ-4 Will Control vs. Relaxed Casualness		42			
			1454			
098	JPQ-5 Impatient Dominance		43			
			1454			
099	JPQ-6 Cyclothymia vs. Schizothymia		44			
			1454			
100	JPQ-7 Adventurous Cyclothymia vs. Withdrawn Schizophrenia		45			
			1454			
101	JPQ-8 Socialized Morale vs. Dislike of Education		46		268	
					BD6	
			1454		1264	
102	JPQ-9 Independent Dominance		47		269	
					BD7	
			1459		1264	
103	JPQ-10 Energetic Conformity vs. Quiet Eccentricity		48			
			1454			

	Designation of Variable		VII	VIII	IX	X
104	JPQ-11 Surgency vs. Desurgency	MFN Form N	49		270 BD8	
105	JPQ-12 Intelligence		50 1454			
106	SSHA Scholastic Motivation		51 1397		256 AC1 1408	
106a	SSHA Study Habits		52 1397			
106b	SSHA Educational Philosophy		53 1396			
106c	SSHA Teacher Evaluation		54 1397			
106d	SSHA Achievement Drive		55 1397			
106e	SSHA Procrastination		56 1397			
106f	SSHA Self-Confidence		57 1397			
107	CMAS Anxiety		25 1458		263 1398	

	Designation of Variable		VII	VIII	IX	X
108	CYS I Criticism of Education	MFN	26			
		Form				
		N	1458			
109	CYS I Criticism of Youth		27		266	
					BD4	
			1438		1398	
110	CYS I Family Problems		28			
			1458			
111	CYS I Authoritarian Discipline		29		265	
					BD3	
			1458		1398	
112	CYS I Orientation to Society		30		264	
					BD2	
			1458		1398	
113	CYS I Self Inventory		31			
			1458			
114	CYS II Personal Maladjustment		32		258	
					AC3	
			1464			
115	CYS II Resentment of Family Life Style		33			
			1399			
116	CYS II Social Inadequacy		34		257	
					AC2	
			1464		1408	
117	CYS II Social Isolation		36			
			1399			

	Designation of Variable		VII	VIII	IX	X
118	CYS II Resentment of Dependency	MFN	37			
		Form				
		N	1399			
119	CYS II Family Troubles		38			
			1398			
120	Need Nurturance			166		
				1398		
121	Need Autonomy Anxiety			167		
				1337		
122	Need Aggression Anxiety			168	259	
					AC4	
				1339	1408	
123	Need Autonomy			169		
				1341		
124	Need Achievement			170	260	
					AC5	
				1341	1408	
125	Need Aggression			171	261	
					AC6	
				1315	1408	
126	Need Dominance Anxiety			172		
				1337		
126	Need Isolation Anxiety			173		
				1331		

	Designation of Variable		VII	VIII	IX	X
127	Need Isolation Anxiety	MFN		173		
		Form				
		N		1331		
128	Need Achievement Anxiety			174	262	
					AC7	
				1336	1408	
129	Need Dominance			175		
				1333		
130a	Index of Social Status		62		371	
			1198		945	
130b	Index of Value Orientations		63			
			1252			
131	CYS II Family Tension		35			
			1464			
155	Vocabulary Completion		15			
			1439			
156	Writing X's		59			
			1443			
157	Copying Test		60			
			1443			
158	Writing Lack		19			
			1371			

	Designation of Variable		VII	VIII	IX	X
159	Peer Nomination: Where I Fit In	MFN	65			
		Form				
		N	1259			
160	Peer Nomination: Where My Friends Fit In		66			
			1269			
161	Peer Nomination: Where I Would Like to Fit In		67			
			1264			
162	Peer Nomination: Personal Model		87			
			1426			
163	DAT: Verbal					406
						327
164	DAT: Numerical					407
						325
165	DAT: Spelling					412
						324
166	DAT: Sentences					413
						315

HTRP, a reader may note, employed self-report and nomination instruments in addition to "standardized aptitude and achievement scales." A number of the instruments are identical to those described by Moore and Holtzman in a study of over 12,000 Texas high school students, Tomorrow's Parents (1965), a Cooperative Youth Study in which some HTRP personnel had participated during the planning stage.

Distribution statistics for grades seven, eight, and nine, 1957-58 to 1959-60, are summarized in Table 5.02. Raw score or observed value means and standard deviations for the populations shown in Table 5.01 are presented for each year. No lists of differences between means are shown since a subsequent section on "Sources of Variation in Repeated Observations" contains tables which accomplish that task more effectively. The intraclass correlation coefficients (r_I) shown in Table 5.03 were obtained from the aforementioned tables. The intraclass correlation coefficients indicate the resemblance between seventh- (PA) and ninth-grade (EA) performances when all sources of variation (pubescent transformation or the time, sex role, level of mental function, family background, and their interactions) have been removed. The interclass or Pearson product-moment coefficients (r) may be inflated when sources of variation are not taken into account; yet may show a smaller value than expected when pubescent changes have taken place, for example, in the case of variable 13, "Mutilated Words."

Sources of Variation in Initial Test Performances

One of the earliest tasks was to determine the extent to which a number of sources of variation (experiences in the male and female sex roles as well as in different family backgrounds from one community to another) influenced scores for test performances or values assigned to other kinds of observations. The research

TABLE 5.02

Distribution Statistics for Variables in the Human Talent Research Program from Grade VII (1957-58) to Grade IX (1959-60)

Variable	Score	1957-58		1958-59		1959-60	
	Form	Mean	S.D.	Mean	S.D.	Mean	S.D.
CTMM Mental Function	Index	98.0	14.3			103.6	14.4
STEP Listening	Score	45.8	18.4	49.4	14.4	40.0	11.8
Gestalt Transformation	Score	6.8	2.8			8.3	3.3
DAT Mechanical Reasoning	Score	19.8	11.7				
DAT Abstract Reasoning	Score			70.3	12.0		
DAT Space Relations	Score			30.5	20.0		
DAT Clerical Accuracy	Score	38.7	11.7				
Rhymes	Score	15.0	7.8				
Unusual Uses	Score	5.3	3.5			5.2	2.9
Consequences	Score	27.5	12.0			18.6	5.9
Common Situations	Score	29.4	9.6			16.2	6.7
Seeing Problems	Score	20.3	9.0			9.5	6.5
Gestalt Completion	Score	32.9	8.4				
Mutilated Words	Score	17.7	5.8			16.5	4.4
Short Words	Score	13.6	5.2			18.6	6.6
Dotting (Psychomotor)	Score	106.0	25.0				
DRT Reaction Time	Score	36.7	14.2				
JPQ-1 Emotional Sensitivity	Scale	6.1	2.1			5.8	2.2
JPQ-3 Ego Strength	Scale	4.5	2.1				
JPQ-6 Cyclothymia	Scale	7.3	1.7				
JPQ-4 Control vs. Relaxed	Scale	7.1	2.1				
JPQ-9 Independent Dominance	Scale	5.4	2.1				
JPQ-10 Energetic Conformity	Scale	6.9	1.7				
JPQ-11 Surgency	Scale	6.2	2.1			6.2	2.1
SSHA Scholastic Motivation	Scale	48.9	18.9			22.3	8.0
CMAS Anxiety	Scale	37.9	15.5	36.8	14.6	38.7	14.2
CYS Authoritarian Discipline	Scale	9.2	3.1	8.5	3.1	9.0	2.9

Variable	Score Form	1957-58		1958-59		1959-60	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
CYS Criticism of Education	Scale	14.4	3.8	14.6	4.0		
CYS Criticism of Youth	Scale	6.2	2.2	6.0	2.1	6.0	2.2
CYS Negative Social Orientation	Scale	7.8	2.8	8.0	2.8	7.5	2.7
CYS Personal Maladjustment	Scale	14.9	6.9	13.5	8.7	16.4	5.2
CYS Social Inadequacy	Scale	7.3	4.9	7.3	4.2	7.4	4.3
CYS Self Inadequacy	Scale	8.0	2.7				
CN-Need Achievement	Score	10.9	3.4			95.4	5.5
CN-Need Aggression	Score	7.1	3.8			93.5	7.0
CN-Aggression Anxiety	Score	11.1	3.5			101.9	6.0
ISS Family Status	Index	54.5	14.5			53.1	14.3
ISS Peer Status	Index	10.7	2.7	10.7	3.3		
P-NOM: Wheel	Score	1.6	3.5				
P-NOM: Brain	Score	1.6	3.4			3.3	10.2
P-NOM: Quiet Ones	Score	1.6	2.6			5.2	1.4
P-NOM: Wild Ones	Score	1.1	3.0				
P-NOM: Left Out	Score	1.3	2.0			5.2	1.4
P-NOM: Behavior Model	Score	1.2	3.2			5.0	1.4
P-NOM: Negative Behavior Model	Score	1.6	3.9			5.1	1.4
P-NOM: Academic Model	Score	1.3	2.0			3.7	5.2
P-NOM: Negative Academic Model	Score	1.5	2.5			3.7	5.6
P-NOM: Active	Score	1.3	2.4			3.2	7.3
P-NOM: Passive	Score	1.2	1.5			3.8	8.7
P-NOM: Impulsive	Score	1.1	2.0				
P-NOM: Affective Neutrality	Score	1.1	1.7				
P-NOM: Imaginative	Score	1.3	2.0			5.2	1.4
P-NOM: Daydreamer	Score			1.2	1.9		
P-NOM: Amoral	Score			3.0	8.0		
P-NOM: Expedient	Score			1.3	2.4		
P-NOM: Conforming	Score			1.5	2.3		
P-NOM: Irrational-Conscientious	Score			1.3	2.0		
P-NOM: Rational-Altruistic	Score			1.4	2.7		

TABLE 5.03

Master File Numbers (MFNs) for Variables in Grades VII to IX with Intraclass (r_I) and Pearson Product Moment (r) Correlation

Variable Number	Master File Number (MFN) VII 57-58	IX 59-60	Variable and Forms	Intraclass Correlation r_I	Interclass Correlation r
001	1	212	CTMM Mental Function	.657**	.642
002	13	225	STEP Listening	.706**	.677
003	16	279	Gestalt Transformation	.491**	.594
008	22	284	Unusual Uses	.506	.472
009	24	181	Consequences	.406	.422
010	23	182	Common Situations	.434	.491
011	20	285	Seeing Problems		.472
013	18	280	Mutilated Words	.622	.592
014	14	281	Short Words	.511	.558
017	39	267	JPQ-1 Emotional Sensitivity		.367
023	49	270	JPQ-11 Surgency/Desurgency		.465
024	51	256	SSHA Scholastic Motivation	.547**	.592
025	25	263	CMAS Anxiety	.474**	.554
026	29	265	CYS Authoritarian Discipline		.439
028	27	266	CYS Criticism of Youth		.298
029	30	264	CYS Negative Social Orientation		.412
030	32	258	CYS Personal Maladjustment		.318
031	24	257	CYS Social Inadequacy		.347
033	170+	260	CN-Need Achievement		
034	171+	261	CN-Need Aggression		
038	168+	259	CN-Aggression Anxiety		
036	62	371	ISS Family Status		.999
037	64	859	IPS Peer Status	.250	
039	71	364	P-NOM Brain		.607
040	75	346	P-NOM Quiet Ones		.517
042	77	348	P-NOM Isolated (Left Out)		.392
043	89	340	P-NOM Behavior Model	.397	.520
044	90	341	P-NOM Negative Behavior Model	.287	.399
	93	342	P-NOM Math Ability	.514	
045	82	356	P-NOM Academic Model	.505**	.574
	95	350	P-NOM Adult Orientation	.292	
046	83	358	P-NOM Negative Academic Model	.305	.512
	84	360	P-NOM Party With	.387	
047	85	363	P-NOM Active (Coping)		.476
048	86	357	P-NOM Passive (Avoids Trouble)		.193
	80	352	P-NOM Verbal	.568*	
051	72	344	P-NOM Imaginative		.386
	81	354	P-NOM Hidden Ability (Talent)	.438	

+ Administered in Grade VIII, 1958-59. * Significant at .05 level of confidence

** Significant at .01 level of confidence group also wanted to know the degree to which levels of mental function, or the "self-fulfilling prophecy" (Rosenberg, 1968) insofar as teachers and students are aware of individual CTMM scores and IQs shown on each boy's and girl's "permanent record card," appeared to influence the initial observation either as a "main effect" or as a "moderator variable" (Saunders, 1956) entering into interactions. The method of analysis is given in detail in a published report (McGuire, 1961b) which also contains the factor structure of cognitive and noncognitive variables for the total population, for each sex role, and for each community. The article also contains a study of the regression of CAT Language Achievement scores upon both kinds of variables by community and sex roles, the two major sources of variation considered in that article.

Tables 5.04 (cognitive variables) and 5.05 (noncognitive variables) have been derived from the original 44 analyses of variance (ANOVA) tables, one for each variable. To combine the outcomes of the 44 analyses into two meaningful tables, significant mean squares were transformed into intraclass correlation coefficients, employing an appropriate formula comparing the covariance of scores for individuals (Ss) classified together in subsamples with the average of the variation that would be operating if all the Ss were not so classified. Thus the intraclass correlation is a ratio of two variances (Snedecor, 1946, pp. 243-246) which Fisher (1946, pp. 211-215) believes is somewhat more accurate than the interclass coefficient (r). The value (r_I) can be derived directly from ANOVA mean squares

$$r_I = \frac{MS_b - MS_w}{MS_b + (k-1)\ MS_w}$$

where

MS_b = mean square for "among groups" (subsamples)

TABLE 5.04

Significant Intraclass Correlation Coefficients from Analyses of Variance in Cognitive Performances of 144 Junior High Students

Cognitive Variable	Source of Variation[a]				
	S	F	M	L	Interaction
CAT Reading Achievement		08**	49**		
Vocabulary		05*	44**	05*	
Comprehension		08**	38**		
CAT Language Achievement	25**		41**	09**	
Mechanics of English	18**	09**	45**	13**	
Spelling	18**		29**		
CAT Arithmetic Achievement			40**	20**	
Fundamentals			29**	31**	SFML = 36*
Reasoning			39**		
STEP Social Studies			29**		
Science		05*	19**		FML = 29**
Listening			31**		FML = 24*
DAT Clerical Aptitude	34**				
Mechanical Reasoning	19**		11**		
Vocabulary Completion	07*		49**	07*	
Gestalt Transformation			12**		FML = 31**
Mutilated Words			19**		
Gestalt Completion					SML = 19* .
Short Words	16**		15**	07*	
Copying		10**	14**		SML = 21*
Dotting	15**				ML = 11*
DRT Reaction Time	06*		07*		
Subjects within group, *n*	72	48	48	36	
df	1	2	2	3	

Note.-Rounded and decimal points omitted.

[a] Sex role (S), family status (F), CTMM mental function (M), school location (L); number of subjects in each group, ML = 12, FML = 4, SML = 6, SFML = 2.

* p .05.

** p .01.

TABLE 5.05

Significant Intraclass Correlation Coefficients from Analyses of Variance in Noncognitive Performances of 144 Junior High Students

Noncognitive Variable		Source of Variation[a]				
		S	F	M	L	Interaction
JPQ	1 Sensitivity/Toughness	48**				FL = 10*
	2 Tension/Relaxation			07*		SL = 18*
	3 Emotional/Stable					
	4 Control/Casualness					
	5 Impatient Dominance	06*				
	6 Sociable/Withdrawn					
	7 Adventurous					
	8 Socialized Morale	20**				
	9 Independent Dominance	13**	05*		10**	
	10 Energetic Conformity					
	11 Surgency/Desurgency	24**				
CYS	Family Tension					SFML = 62**
	Negative Social Orientation		10**			
	Authoritarian Discipline			06*		
	Personal Maladjustment					SFML = 40*
	Criticism of Education					SFM = 18*
	Criticism of Youth					
	Social Inadequacy					SL = 23** FML = 32**
	Self Inadequacy					SFM = 22* FML = 30**
CMAS	Anxiety			05*		
SSHA	Scholastic Motivation					SFML = 41*
	Teacher Valuation	05*				FL =09*
	Subjects within group, n	72	48	48	36	
	df	1	2	2	3	

Note.-Rounded and decimal points omitted.

[a] Sex role (S), ISS family status (F), CTMM mental function (M), school location (L); number of subjects in each group, SL = 16, FL = 12, SFM = 8, FML = 4, SFML = 2.

* p .05.

** p .01.

MS_w = mean square for "within groups" (individual differences)

k = number of Ss in each group

and using the deviation term (SFMLP) as MS_w for each coefficient shown in the two tables. Consequently the values for the intraclass correlation coefficients shown in Tables 5.04 and 5.05 may be interpreted as measures of the average degree of "resemblance" among subjects classified in the same sex role (S), family status (F), level of mental function (M), school location (L), or sharing some combination of these attributes (interaction terms).

For the analyses, 144 Ss were drawn by random procedures from the four communities with the numbers in each subsample (n) as shown in the table and the number of categories being one more than the degrees of freedom (d.f.) shown at the base of each table.

From the intraclass correlation coefficients in Table 5.04 and distribution statistics for each subsample, inferences may be drawn. For example, in the sex role (S) main effects supplemented by distributions for boys and girls, one would readily infer that girls resemble one another and excel boys in various aspects of language achievement, in the speed and accuracy with which they cope with clerical tasks, in identifying short, four-letter words (short words) embedded in rows of letters (speed of perceptual closure underlying the factor termed Symbol Aptitude). Moreover, the girls appear to have somewhat greater verbal comprehension as measured by Vocabulary Completion and Discrimination Reaction Time, tests described in Appendix A. As one might predict, however, boys outperform girls in reasoning through pictorially-presented mechanical situations (Test 080, DAT Mechanical Reasoning described on p. A-8 of Appendix A).

Since performance upon IQ tests (M) such as the CTMM Mental Function (Variable 074a, p. A-7 of Appendix A) are supposed to be related significantly to family status (F), there should be few, if any, instances where the two variables have independent influences when the subsamples for "high," "medium," and "low" categories of 48 boys and girls are involved. Notice, however, that there are seven instances where family social status (F) and CTMM Mental Function have statistically independent influences, particularly in the case of Copying where there is not significant interaction involving F and M (which is the case with reference to CAT Arithmetic Fundamentals, STEP Social Studies where there also are main effects for F and M). In most instances where there is no independent influence of family background (F) but significant differences in performance according to level of Mental Function (M), there is a statistically significant interaction with subsamples classified according to M and F as well as other sources of variation (SFML = 36* for CAT Reasoning, FML = .22* for STEP Social Studies, FML = .24* for STEP Listening, FML = .31* for Mutilated bonds). Where neither F nor M is independently influencing performances on the variable, there is interaction involving both sources of variation (SFML = .31* for Clerical Aptitude). These results are discussed in a different manner but more **extensively** in the 1961 article.

In the variables classified as being "noncognitive," a questionable categorization since each performance on the instruments requires some central-process activity, sex role and community locations which both reflect variations in experiences tend to be significant sources of variation, either independently or in an interaction, more frequently than either family background (F) or level of mental function (M). Perhaps the nature of the communities is reflected in response to the JPQ scale for Independent Dominance: values are highest in the long-established city of Centerville and lowest in the new coastal community of Duneside which, increasingly, is becoming dependent upon the establishment of industrial plants with substantial payrolls. Of the eleven statistically significant interactions in Table 5.05, nine involve variations from one location to another. Again the reader should look up the article (McGuire, 1961b) for a more detailed discussion of sources of variation in test performances.

Sources of Variations in Repeated Observations

To save space, we first present three examples of the tables employed for analysis of observations on the same persons in Grades VII (PA) and IX (EA) for different purposes. Then we show summary tables which have been constructed from similar analyses (the original tables being kept for any future reference). The procedure has been adopted to condense the presentation and to permit references to specific analyses which may be of more than passing interest.

Table 5.06 represents an analysis of variance (ANOVA) in the repeated observations, PA to EA (T), of values representing age-mate nominations as Academic Model (Variable 018, p. A-5). The subjects (Ss) are 240 seventh-grade students drawn by a randomization procedure to represent relative "cultural deprivation" (C), 120 "advantaged" and 120 "disadvantaged" in terms of family background (LC vs. MC, with each of the four communities having equal probabilities for representation). Further, each subsample was drawn so as to have 60 males and 60 females from the age-grade being observed.

In Table 5.06 and the two which follow, the portion of the ANOVA procedure labeled "Independent Variation" really is an alaysis of each S's "pre + post" values summed. The deviation term "CSP," which actually refers to individual differences among persons (P) categorized by "degree of cultural deprivation" (C) and "experience in a sex role" (S) has a true "mean square between persons," MS_b = 2.68, because that portion of the variation in P-NOM Academic Model values attribut-

TABLE 5.06

Analysis of Variance in P-NOM Academic Model from Grade VII (1957-58) to Grade IX (1959-60)

Source of Variation	df	Sum of Squares	Mean Square	F Ratio
Independent Variation				
Cult. Dep. vs. Cult. Adv. (C)	1	11.41	11.41	4.25*
Sex Role (S)	1	20.83	20.83	7.76**
Interaction (CS)	1	1.88	1.88	.70
Deviation (CSP)	236	633.58	2.68	2.98
Between Variance	239	667.70		
Correlated Variation				
Time (T)	1	.08	.08	.08
Interaction (TC)	1	.13	.13	.15
Interaction (TS)	1	.41	.41	.45
Interaction (TCS)	1	3.33	3.33	3.71
Residual (TCSP)	236	212.05	.90	
Within Variance	240	216.00		

Intraclass r = .4985 or .498

	Means		Means	
Grades	Cult. Dep.	Cult. Adv.	Boys	Girls
VII	5.08	5.35	4.98	5.45
IX	5.07	5.41	5.06	5.44
Mean	5.09	5.38	5.02	5.44

able to C and S both have been removed in the process of its computation. Similarly the portion of the ANOVA table headed "Correlated Variation" is an analysis of the values for P-NOM Academic Model taken one at a time over the pretest and posttest (T) to yield a residual "TCSP" which represents the individual differences within persons before and after pubertal transformation (T), if any, after they have been classified according to "degree of cultural deprivation" (TC) and "experience in a sex role"(TS), as well as for interaction (TCS). The remaining mean square represents the true variation within persons from the Grade VII to the Grade IX nominations, $MS_W = .90$, which is entered as shown for the computation of the intraclass correlation coefficient. Since there are only two observations of each individual, $k = 2$.

The sets of means shown at the base of Table 5.06 and others like it (to follow) facilitate interpretation of any statistically significant mean square and provide a basis for statistical references. In Table 5.06, the "culturally advantaged" appear to have a tendency ($p < .05$) toward receiving more nominations from age-mates as Academic Models before and after the pubescent changes (inferred from means). Moreover, girls clearly are named by their peers as Academic Model's more frequently than boys ($p < .01$) both before and after pubertal changes. The absence of any statistically significant mean squares under correlated variation would lead one to infer that there is no transformation in model value in the age-mate assessments of one another from the PA to the EA period.

Table 5.07, which is an ANOVA for the scores for Seeing Problems, is quite similar to the previous one in form. This time a randomized sample of 192 persons has been drawn with 48 Ss in each of the four locations (L), equally divided into "advantaged and deprived." Again, the "culturally advantaged" are more likely to perform effectively ($p < .01$) on the test for Seeing Problems than the

TABLE 5.07

Analysis of Variance in Seeing Problem from
Grade VII (1957-58) to Grade IX (1959-50)

Source of Variation	df	Sum of Squares	Mean Square	F Ratio
Independent Variation				
Cult. Dep. vs. Cult. Adv. (C)	1	50.32	50.32	18.81**
Location (L)	3	31.70	10.57	3.95**
Interaction (CL)	3	11.61	3.87	1.45
Deviation (CLP)	184	492.31	2.68	(2.50)**
Between Variance	191	585.94		
Correlated Variation				
Time (T)	1	1.15	1.15	1.07
Interaction (TC)	1	.02	.02	.02
Interaction (TL)	3	26.53	8.84	8.28**
Interaction (TCL)	3	9.40	3.13	2.94*
Residual (TCLP)	184	196.40	1.07	
Within Variance	192	233.50		

Intraclass $r = \frac{2.68-1.07}{2.68+(1)1.07} = \frac{1.61}{3.75} =$ .429 or $.\underline{43}$** $\qquad$ $F = \frac{2.68}{1.07} = 2.50$**

	Means		Means			
Grades	Cult. Dep.	Cult. Adv.	A	B	C	D
VII	4.60	5.31	4.71	4.98	4.79	5.35
IX	4.48	5.22	4.44	5.69	4.67	4.60
Mean	4.54	5.27	4.58	5.34	4.73	4.98

"deprived" ones. Analysis by locations places Bandana (5.34), Duneside (4.98), Ashton (4.58), and Centerville (4.73) in that order. Upon inquiry into the significant interaction when the correlated variation is taken into account (TCL with MS = 8.28**), culturally disadvantaged Ss at Duneside (which had integrated schools from the beginning of the HTRP) were less effective in Grade IX (EA) upon the Seeing Problems test than they had been in Grade VII (PA) before the pubescent transformation. These comparisons were made with the advantaged and with the trends in Bandana where the opposite was true. Perhaps the pubescent transformation marked a negative response set being established during the years of transformation!

Table 5.08 is the prototype of analyses to compute the most efficient intraclass correlation coeffieients for Table 5.03. The dependent variable is a set of scores representing Scholastic maturation obtained from the Brown-Holtzman SSHA (Variable 106 described on p. A-13) for a sample of 576 Ss, 144 from each of four community locations (L), divided into 72 representatives of each sex role (S).[9] The most important single inference to be drawn from the table involves the highly significant decrease in SSHA Scholastic Motivation scale values from Grade VII (PA) to Grade IX (EA) observations. Apparently the pubescent changes in body image and expectancies bring about a rather startling shift in response

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[9] Originally, the plan was to use a sample of 576 subjects from among those with repeated observations, 144 from each of the four community locations (L), equally divided among boys and girls (S), and for family background--employing LM, UL, LL subsamples (F), followed by an analysis according to relative "cultural deprivation" (C). The initial computer program was not "debugged" in time to carry out either analysis. Now Veldman (1967, pp. 246-268) has published Program ANOVAR, with several variations, which should be adapted to carry out the tests of hypotheses implicit in the LSF and LSC sampling designs (perhaps also considering "M" or subsamples according to levels of Mental Function).

TABLE 5.08

Analysis of Variance in SSHA Scholastic Motivation from Grade VII (1957-58) to Grade IX (1959-60)

Source of Variation	df	Sum of Squares	Mean Square	F Ratio
Independent Variation				
Sex Role (S)	1	9370.13	9370.13	23.38**
Location (L)	3	5019.49	1673.16	4.02**
Interaction (SL)	3	623.03	210.68	.51
Deviation (SLP)	568	236364.64	416.13	
Between Variance	575	251386.29		
Correlated Variation				
Time (T)	1	4544.22	4544.22	37.33**
Interaction (TS)	1	20.06	20.06	.16
Interaction (TL)	3	712.91	237.63	1.95
Interaction (TSL)	3	250.07	83.36	.68
Residual (TSLP)	568	69143.75	121.73	
Within Variance	576	74671.01		

Intraclass r = .547

	Means		Means			
Grades	M	F	A	B	C	D
VII	50.62	56.70	56.38	55.37	50.35	52.55
IX	46.91	52.46	52.95	49.76	48.70	47.31
Mean	48.77	54.58	54.67	52.58	49.53	49.93

behavior to items of the Survey of Study Habits and Attitudes which would confirm the "transformation hypothesis" demonstrated earlier in Chapter IV. In addition, the analysis supports the Sherif and Cantril (1947) postulate about the "Re-formation of the Ego in Adolescence" (pp. 199-279). In their chapter 8, they focus upon variations from one cultural context to another; but, in chapter 9, the two early developmental-social psychologists describe "adolescents' efforts to re-establish themselves" and introduce data upon "the effects of age-mate reference groups" which have been represented in this report by sociographs covering the period of transformation back in Chapter III (pp. 3-30 to 3-52). The more positive responses of girls than boys to the SSHA occur at the PA and EA observations (no significant TS interaction). Although there are decreases in scale values in each of the four communities, members of the sample population drawn from Ashton retain first position relative to the other communities in their response behaviors (No TL or TSL interactions).

Cultural background and sex-role variations.- Table 5.06 is the prototype for the analysis of variance in repeated observations of a sample population of 240 Ss drawn to represent relative cultural deprivation--"Deprived" versus "Advantaged" (C), the two sex roles (S), and a test of transformation (T) from PA to EA observations for the variables listed in Table 5.09. Although girls more frequently are nominated by their peers as being Verbal (Variable 035, p. A-6), there is a trend toward a relatively greater reduction for girls than for boys ($F = TS/TCS = 7.57$; $p < .05$). Nominations for Hidden Ability (Variable 036, p. A-6) increase for boys and decrease for girls (TS = 7.67**) over the years of transformation. Nominations for Party With are received more often by the "culturally advantaged" and by girls and there is a general increase in the mean level of such nominations from PA to EA.

Table 5.9

Mean Squares for Analysis of Variance in HTRP Measures of Grades VII and IX (T)
According to Degree of Cultural Deprivation (c), Sex Role (S), and Location (L) for a sample of 240 Persons (P).

HTRP Measures	Independent Variation				Correlated Variation				
Grades VII and IX	C	S	CS	CSP	T	TC	TS	TCS	TCSP
P. Nom. Verbal	3.50	30.50**	.00	2.69	5.85**	1.52	5.00*	1.10	.74
P. Nom. Hidden Ability	6.08	9.08	1.88	2.58	.83	1.63	7.50**	.13	.98
P. Nom. Party With	31.01**	20.83**	.01	2.43	14.70**	.01	.30	3.01	1.07
P. Nom. Behavior Model	20.83**	6.08	.21	2.45	4.03	.00	2.11	.21	1.06
P. Nom. Adult Orientation	19.20**	11.41*	.68	2.24	.83	2.13	1.01	.41	1.23
P. Nom. Math Ability	.60	29.50**	.05	3.13	.47	1.75	7.75**	.02	1.01
SSHA Scholastic Motivation	1128.75	4906.28**	6.33	383.76	669.90*	75.08	1.65	236.33	120.39
CMAS Anxiety	2856.05**	1125.00*	101.25	282.01	1.80	.45	2.45	130.05	101.71
STEP Listening	8120.45**	400.51	605.00	192.27	6037.81**	54.45	82.01	22.05	43.84
Gestalt Transformation	427.81**	57.80*	6.05	11.05	125.00**	9.80	4.51	6.61	3.78

Being named as a Behavior Model (Variable 017, p. A-5) is more frequent for the culturally advantaged with no significant sex-role differences or transformation during the pubescent years. Being looked upon as positively oriented to adults is more frequent among the culturally advantaged with a tendency toward girls being named more often than boys. In general girls are nominated more often than boys for "math ability," particularly in the PA observations, but, with the intervention of pubescent changes, boys begin to be nominated more frequently on the EA valuations and girls less often (TS interaction).

With reference to SSHA Scholastic Motivation in Table 5.09, girls earn high scale values but, as shown in Table 5.08, there is a general reduction for all respondents from the PA to the EA administrations, with no significant variation for the culturally "deprived" or "advantaged" (although, in terms of mean scores, the latter seem to become more negative toward academic achievement). The "deprived" represent themselves as being more anxious than the "advantaged" and the girls show a greater tendency toward representing themselves as being anxious than do the boys. On STEP Listening (Variable 075, p. A-8), which we have good reason to believe is a measure of impulse control (Chapter III in McGuire, et al., 1968), two crucial hypotheses are supported. First, as one would expect from the studies of Warner and Associates (1949), the "culturally deprived" perform at a significantly lower level than the middle-class S's, another indicator that the instrument measures impulse control or what Parsons and Shils (1951) term "affective neutrality" (which permits one to be alert and hear what is said in a classroom and similar settings). Second, as one would predict (Sherif & Cantril, 1947), there is an overall decrease in scores (toward greater impulsivity) after the pubescent transformation. Gestalt Transformation (Variable 082, p. A-9) is supposed to be a measure of conceptual redefinition. As one would expect, the relatively deprived children are lower in response capabilities upon this instrument. With the transformation into adolescence, as one would anticipate from Piaget's genetic approach to thought (1961), the level of response behavior to the instrument increases for both sexes and both cultural backgrounds (significant main effect for T without TS and TC interaction).

Cultural background (C) and location (L) as sources of variation.- Table 5.07, which as a sample population of only 192 Ss is a prototype for all of the 17 analyses summarized in Table 5.10 where the N for each sample population is 240 Ss (confirmed by reference to original tables). As one would expect from the analysis in Table 5.09, being nominated as Verbal (Variable 035, p. A-6) decreases significantly from the PA to the EA age-mate evaluations of one another; but, contrary to that trend toward a decrease in the other three communities, there is an increase in the mean number of nominations from Grade VII to Grade IX at Centerville (TL interaction). The increase in Centerville nominations for "math ability" (TL = 2.95*) represents a parallel trend. With the transition to adolescence, there is a significant increase in nominations for "party with" from PA to EA observations (T main effect) with the "culturally advantaged" being preferred both times (C main effect). As expected there is a trend toward reductions in nominations as Behavior Model (Variable 017, p. A-5) from PA to EA with a clear preference for the middle class peers. Being named as a Negative Behavior Model (Variable 043, p. A-7) shows a trend toward a decrease from PA to EA at Ashton and Duneside but not in the other two communities (L = 6.70*). Most of the remaining variables follow patterns identified in Table 5.09 or do not show highly significant variations from the pattern. For example, values for STEP Listening (Variable 075, p. A-8) reflect the impulsivity which seems to characterize the culturally deprived (C main effect) and to increase with the PA-EA transformation (T main effect) a change marked by decreases in the mean which proportionately are greater for Bandana (TL = 141.25*) than the other communities.

Table 5.10

Mean Squares for Analysis of Variance in HTRP Measures of Grades VII and IX (T) According to Degree of Cultural Deprivation (C), and Location (L) for a Sample of 240 Persons (P).

HTRP Measures	Independent Variation				Correlated Variation				
Grades VII and IX	C	L	CL	CLP	T	TC	TL	TCL	TCLP
P. Nom. Verbal	3.50	4.78	.55	2.80	5.85**	1.52	3.66**	.75	.72
P. Nom. Math Ability	.60	1.90	1.34	3.27	.46	1.75	2.95*	1.66	1.00
P. Nom. Party With	31.01**	5.53	2.35	2.46	14.70**	.01	.96	.35	1.09
P. Nom. Behavior Model	20.83**	3.58	6.44	2.39	4.03*	.00	2.88*	1.71	1.03
P. Nom. Negative Behavior Model	3.85	6.70*	2.12	2.12	2.00	.00	1.17	.14	1.22
P. Nom. Academic Model	11.41*	3.73	3.50	2.74	.08	.13	1.63	.66	.90
P. Nom. Negative Academic Model	1.01	5.09	4.39	2.17	.08	6.53	.93	1.63	1.18
P. Nom. Adult Orientation	19.20**	14.67**	10.61**	2.00	.83	2.13	.05	1.15	1.24
SSHA Scholastic Motivation	1128.75	278.33	441.46	411.98	669.90*	75.08	100.51	47.19	122.19
CMAS Anxiety	2856.05**	520.48	416.82	279.00***	1.80	.45	17.10	266.35*	99.67
STEP Listening	8120.45**	251.22	536.94*	188.38	6037.81	54.45	141.25*	30.04	42.39
Gestalt Transformation	427.81	15.12	12.17	11.22	125.00**	9.80	2.94	6.29	3.77
Short Words	18.38**	29.26**	1.04	2.69	.17	.09	2.67	.51	.87
Mutilated Words	17.09*	21.57*	.94	3.45	.13	.44	.44	1.38	.80
Unusual Uses	53.25**	1.36	1.97	2.59	7.32**	.13	2.69*	1.91	.85
Common Situations	35.65**	7.36*	5.42	2.58	.44	2.19	.53	5.22	1.02
Consequences	26.04**	7.20*	7.40*	2.42	6.51*	.17	1.95	.56	1.02

In general, the lower-class "relatively deprived" have less effective performances than the middle-class subsamples on measures of symbol aptitude (Short Words, Mutilated Words) and divergent thinking (Unusual Uses, Common Situations, Consequences). From the table, one would infer variations among the four communities as well as a slight trend toward less divergent thinking after the transformation to early adolescence.

Sex role and location as sources of variation.- Table 5.08, which not only is a prototype for Table 5.11 but also has its mean squares in the first row after SSHA Scholastic Maturation, was based upon a sample of 576 Ss as are the entries for CMAS Anxiety (Variable 107, p. A-13) and Index of Peer Status (Variable 010, p. A-4). Like Scholastic Maturation, CMAS Anxiety scale scores are higher for girls than for boys (S main effect). Although there are no significant differences in summed pre + post CMAS values from one community to another, there is a decrease in values for boys in Bandana and Duneside (TSL = 335.36*) with compensating increases in Ashton and Centerville. When all possible sources of variation are removed, the IPS values indicate a rather small yet statistically significant degree of stability from the Grade VII to the Grade IX sociographs in Chapter III (r_I = .250**).

Computation of Preadolescent (PA) and Early Adolescent (EA) Factor Scores

During the analysis of the HTRP data, a number of us have begun to conceive in a new way the configuration of elements or behavioral responses which contribute most to what we preciously termed "factor variables" (McGuire & Associates, 1960; McGuire, Jennings, Murphy, & Whiteside, 1968). The configurations of weighted predictor measures might well be regarded as Gestalten. In Productive Thinking (1945), Wertheimer as much as says that methods can be developed for the description and measurement of structures and whole qualities. We have come

Table 5.11

Mean Square for Analysis of Variance in HTRP Measures of Grades VII and IX (T)
According to Degree of Sex Role (S), and Location (L) for a Sample of 575 Persons (P).

HTRP Measures Grades VII and IV	Independent Variation				Correlated Variation				
	S	L	SL	SLP	T	TS	TL	TSL	TSLP
SSHA Scholastic Motivation	9370.13**	1673.16**	210.68	416.13	4544.22**	20.06	237.63	83.36	121.73
CMAS Anxiety	5499.38**	939.77	263.26	321.69	50.42	102.13	82.99	335.36*	94.29
Index of Peer Status	9.09	16.03	9.55	14.18*	5.14	.63	12.84	8.05	8.51

to believe that the output of principal-axis factor analytic procedures recorded in Table 5.12 (factor loadings of 15 factors together with their communalities, h^2) and the regression weights obtained by pivotal condensation of the original triangle of intercorrelations among 57 seventh-grade variables upon each of the fifteen column vectors of factor loadings in turn as recorded in Table 5.13 are the crucial steps in accomplishing the task set by Westheimer--to quantify the elements contributing to a configuration. The beta weights represent the unique contribution of every original variable to each factor. The factor loadings are spurious since a number of measures are highly intercorrelated. Thus the factor loadings cannot be used to compute factor scores. But the "modal values" or regression weights in the fifteen columns of Table 5.13 represent unique contribution of each possible element (original variable) to each of the Gestalten or "factors in persons." Consequently the scores or values each person had on the original tests can be multiplied by the appropriate modal or beta weights to compute a "factor score" for each subject. The original Jennings-Veldman ABSTRAC Program (1963) accomplished the whole task on the CDC 1604 system in one "pass," printing out values such as those shown in Tables 5.12 and 5.13 as required and with the option of listing factor scores of Ss for each factor variable or Gestalten should they be required.

From Tables 5.12 and 5.13, we have selected some of the elements (predictor measures) which characterize each of the factor variables or Gestalten I to XV in Table 5.14. For the convenience of the reader and to provide a referent for later analyses, each one has been given a name. In addition, master file numbers (MFN), factor loadings (from Table 5.12), and regression weights (from Table 5.13) are entered. Comparison of factor loadings and the modal weights indicates that spurious elements in the factor loadings have been removed. Guilford (1954, p. 404) terms the procedure "removing the linear restraints" which is necessary

TABLE 5.12

Varimax Factor Structure of 57 Dimensional Variables (Predictors)

Measured in Seventh-Grade Year at Four Community Locations

of the Human Talent Research Program (N = 1570)

(Entries rounded, no decimal points; "" designates highest loading in row, "*" other major loadings)**

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	h^2
1	CTMM Mental Function	1	128	-098	700**	-035	-060	069	-251*	-007	-049	099	-165	040	030	-027	025	632
2	STEP Listening	13	122	-074	614**	-081	-134	174	-133	012	053	144	-203	048	140	010	117	570
3	Gestalt Transformation	16	101	-054	679**	033	008	-003	-015	-070	-026	026	-052	024	-064	003	019	490
4	DAT Mechanical Reasoning	143	048	-101	731**	-022	117	-152	100	019	140	006	-050	-083	089	147	050	656
5	DAT Space Relations	161	019	-065	672**	-074	-054	-098	023	060	063	102	051	041	-063	212	054	549
6	DAT Clerical Speed & Accuracy	142	141	-025	229	-110	-141	038	-331*	-062	-061	084	-235	030	079	451**	048	498
7	GFT Rhymes	21	153	-020	602**	052	-108	121	-360*	055	-108	070	-191	024	-092	-070	051	618
8	GFT Unusual Uses	22	128	008	605**	019	-032	038	-126	026	-048	-023	-266*	-121	-058	-074	044	501
9	GFT Consequences	24	115	-066	264*	017	-044	062	-077	013	-003	018	-757**	-024	-040	043	-033	678
10	GFT Common Situations	23	060	-068	150	-001	-046	017	-058	-033	025	083	-798**	-009	046	139	-002	703
11	GFT Seeing Problems	20	041	-048	302*	-002	-065	013	-163	080	-099	088	-686**	-017	-019	081	076	633
12	Gestalt Completion	17	011	-040	465**	-032	003	022	-284*	022	-007	034	-199	-090	119	365*	067	501
13	KRT Mutilated Words	18	140	-025	318*	-069	-054	084	-627**	058	-115	088	-179	026	029	167	-009	615
14	KRT Short Words	14	132	022	238	-057	-067	081	-652**	018	-100	135	-130	048	-059	078	-002	571
15	PMT Dotting Test	58	169	016	182	-157	-077	014	-145	099	-104	107	-263*	-026	-001	505**	131	488
16	DRT Discrimination	61	093	-074	408**	-008	041	047	-107	-112	101	111	-181	026	038	369*	068	407
17	JPQ-1 Emot'l Sensitivity	39	-043	270*	-169	-071	-415**	197	-038	058	-168	-033	067	168	-067	056	-047	396
18	JPQ-3 Neurotic vs. Ego Strength	41	-105	466**	-165	035	465*	116	146	-009	-097	-053	004	121	040	-033	-067	542
19	JPQ-6 Cyclo vs. Schizothymia	44	038	-078	089	027	-523**	-036	-008	-035	-030	036	-102	-109	-023	-002	024	317
20	JPQ-4 Will Control vs. Relaxed	42	002	-063	-134	-051	-611**	-418	-075	-002	-090	-019	048	074	-051	055	-076	605
21	JPQ-9 Independent Dominance	47	011	163	166	073	601**	020	257*	-036	-119	-032	-038	-057	061	-099	-122	537
22	JPQ-10 Energetic Conformity	48	064	-282*	092	-072	-035	583**	-066	055	032	052	001	-077	-051	094	060	470
23	JPQ-11 Surgency vs. Desurgency	49	001	088	-073	039	126	769**	-093	015	036	089	-082	-043	092	-007	124	673
24	SSHA Scholastic Motivation	51	166	-246	262*	-197	-581**	014	006	034	-123	089	-158	044	104	-070	-024	600
25	CYS CMAS Anxiety	25	-081	677**	-125	024	267*	010	006	062	-075	-062	045	012	-005	039	-349*	692
26	CYS Authoritarian Discipline	29	-015	056	-146	-044	-044	-149	082	-025	-069	-040	030	033	-020	-083	-729**	605
27	CYS Critic of Education	26	-225	154	-185	102	439**	031	-169	018	120	-041	172	-098	-179	258*	-172	524
28	CYS Critic of Youth	27	037	153	-010	-028	-026	025	-042	004	-063	012	-041	004	064	-077	-769**	636
29	CYS Neg. Soc. Orient'n.	30	-054	193	-198	079	310*	-133	-031	003	041	-046	086	-099	-091	122	-586**	588
30	CYS Personal Maladjustment	32	-034	813**	-064	124	090	-038	002	-022	-020	-034	029	-078	009	-094	-021	710
31	CYS Social Inadequacy	34	-005	814**	-060	-024	-014	-077	-038	-050	032	-016	041	049	034	-048	-011	686
32	CYS Self Inadequacy	31	-109	612**	-088	016	318*	-048	014	029	072	-056	110	011	-068	129	-231	595
33	CNN Need Achievement	170	066	-096	-038	004	019	-225	-167	-021	-772**	036	-039	-115	030	-108	-111	731
34	CNN Need Aggression	171	-025	133	-042	029	521**	-176	-237	045	105	008	-048	-080	169	-399*	086	597
35	CNN Aggressive Anxiety	168	005	155	-013	-074	-246	131	-034	-014	-704**	055	-022	139	012	206	-037	672
36	Family Social Status (Signs Reversed)	62	145	-150	474**	-117	081	-008	281*	235	-306*	158	-232	-041	-129	016	267*	685
37	NOM Wheel	70	598**	-049	079	141	-021	013	-005	175	010	342*	-045	-321*	117	135	026	672
38	NOM Brain	71	659**	-012	318*	-048	-107	-069	-019	101	014	232	-061	120	038	-013	-000	639
39	NOM Quiet One	75	060	036	-042	042	-022	-105	-062	-030	006	-022	032	784**	-064	-004	016	645
40	NOM Wild One	76	215	-015	-097	643**	138	032	-014	-053	069	-103	-040	-287*	-126	113	-002	621
41	NOM Left Out	77	-185	108	-006	686**	-045	-034	011	108	-029	020	030	225	082	-153	-008	614
42	NOM Behavior Model	89	363*	-034	042	-078	001	056	-038	818**	-022	196	-054	-018	-055	066	020	864
43	NOM Neg. Behavior Model	90	-051	014	-006	429*	008	034	-031	816**	052	-013	-001	-024	056	-072	002	867
44	NOM Academic Model	82	697**	-055	138	-066	-104	-022	-092	117	004	309*	-059	177	100	059	-028	691
45	NOM Neg. Academic Model	83	-149	008	-026	722**	041	-050	093	179	076	097	051	113	234	-063	033	679
46	NOM Active	85	659**	-052	139	125	-031	032	-039	174	-025	348*	-043	-155	100	159	054	692
47	NOM Passive (Avoidant)	86	308*	-115	151	442**	029	053	106	015	-002	167	-010	330*	145	205	010	541
48	NOM Impulsive	98	051	-018	-050	781**	101	-012	-027	072	016	057	-071	-069	124	-047	043	665
49	NOM Affective Neutrality	99	608**	-102	040	060	-056	005	-090	068	-074	373*	-048	260*	-022	058	-028	621
50	NOM Imaginative	72	635**	021	152	237	010	016	-052	-109	-083	026	-014	-134	-186	053	011	561
51	NOM Daydreamer	73	129	128	-016	663**	037	031	049	-096	-034	-051	056	-042	-297*	-048	-056	589
52	NOM Amoral	176	026	021	-021	108	081	051	013	-013	-029	-055	012	-065	809**	026	-010	686
53	NOM Expedient	177	124	-059	019	192	-042	004	-146	028	051	715**	-090	-278*	158	-019	017	706
54	NOM Conforming	178	207	-052	072	010	038	115	-063	023	-028	767**	-072	-062	-014	041	042	672
55	NOM Conscientious	179	269*	-018	186	-001	-051	-014	-008	021	-060	717**	-022	147	-113	013	012	663
56	NOM Rational Altruistic	180	314*	-027	111	-104	-101	060	-026	079	-057	740**	-040	141	-097	104	016	737
57	Age-Mate IPS	64	532**	-092	025	-260*	-043	108	-114	-060	026	-008	-134	037	-040	-083	021	419

TABLE 5.13

Modal Values for 57 Dimensional Variables (Predictors)
Over 15 Factors for Students in Seventh-Grade Year in Four Community Locations
of the Human Talent Research Program (N = 1570)

(Entries rounded, no decimal points; "**" denotes highest modal value, "*" other significant values for the variable)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
1	CTMM Mental Function	1	-028	0	192**	004	0	051	-099	-022	-008	-005	069	026	012	-125*	-063
2	STEP Listening	13	-020	046	156**	-011	-052	117*	0	-015	064	012	010	027	101*	-082	-018
3	Gestalt Transformation	16	-008	006	231**	031	0	024	050	-058	-018	-020	091	009	-051	-057	-052
4	DAT Mechanical Reasoning	143	-026	0	237**	-005	034	-116*	126*	009	075	-014	082	-048	069	087	-030
5	DAT Space Relations	161	-082	012	228**	-006	-017	-070	080	045	042	025	156*	007	-043	136*	-027
6	DAT Clerical Speed & Accuracy	142	0	008	-035	0	-009	-031	-127*	-045	-006	-024	-029	022	083	304**	024
7	GFT Rhymes	21	-006	020	148*	047	-028	076	-184*	012	-044	-032	040	005	-088	-185**	-016
8	GFT Unusual Uses	22	007	057	161**	019	-027	027	-010	005	-011	-064	-036	-084	-068	-151*	-016
9	GFT Consequences	24	0	0	-052	020	0	008	072	-003	057	-029	-430**	023	-058	-045	-066
10	GFT Common Situations	23	-026	003	-117*	008	011	-043	091	-037	085	017	-483**	046	004	048	-025
11	GFT Seeing Problems	20	-063	015	-044	010	007	-056	0	036	-014	007	-357**	015	-048	-016	021
12	Gestalt Completion	17	-062	0	073	004	022	-038	-105*	008	0	-021	023	-047	099	235**	006
13	KRT Mutilated Words	18	-010	-020	005	0	040	0	-393**	032	-036	-038	054	023	014	018	-010
14	KRT Short Words	14	-016	-003	0	004	022	0	-432**	0	-028	005	057	036	-055	-058	005
15	PMT Dotting Test	58	0	044	-056	-035	013	-069	012	063	-048	-024	-074	-017	006	372**	093
16	DRT Discrimination	61	-029	-010	060	020	036	-009	015	-086	075	017	-010	034	028	250**	0
17	JPQ-1 Emot'l Sensitivity	39	-017	151*	-014	005	-217**	183*	016	048	-066	-022	035	057	-028	033	-010
18	JPQ-3 Neurotic vs. Ego Strength	41	006	116*	-013	-024	156**	080	098	-005	-112*	007	-064	113*	033	006	034
19	JPQ-6 Cyclo vs. Schizothymia	44	-019	066	026	050	-258**	0	042	-030	034	008	-022	-136*	-007	-024	-013
20	JPQ-4 Will Control vs. Relaxed	42	-009	036	-048	015	-234*	-270**	-057	015	013	0	011	-020	-016	069	0
21	JPQ-9 Independent Dominance	47	026	-015	094	-016	247**	030	186*	-036	-153*	-004	-033	007	045	-053	-054
22	JPQ-10 Energetic Conformity	48	-006	-115*	021	-004	-010	416**	004	024	0	-026	079	-024	-050	023	-083
23	JPQ-11 Surgency vs. Desurgency	49	-005	043	-028	009	-004	537**	-003	-032	004	009	-014	0	048	-063	0
24	SSHA Scholastic Motivation	51	0	0	063	-028	-233**	052	076	012	-012	-004	-022	-022	095	-121*	-096
25	CYS CMAS Anxiety	25	0	213**	023	-014	009	028	024	046	-028	0	-009	0	008	034	-103*
26	CYS Authoritarian Discipline	29	0	-078	030	-006	-040	0	066	006	005	008	-037	007	006	-048	-447**
27	CYS Critic of Education	26	-084	-048	-038	021	171*	-019	-164*	036	034	035	090	-027	-152*	244**	-053
28	CYS Critic of Youth	27	-005	-031	068	-012	-062	135*	020	009	027	015	-025	0	074	-092	-498**
29	CYS Neg. Soc. Orient'n.	30	-006	-056	-012	006	098	-054	-031	018	040	010	004	-040	-057	132*	-310**
30	CYS Personal Maladjustment	32	023	370**	041	015	-099	-015	017	-019	014	017	-018	-100*	012	-087	121*
31	CYS Social Inadequacy	34	052	382**	016	-032	-134	-058	0	-043	089	008	-013	-020	044	-048	113*
32	CYS Self Inadequacy	31	-004	195*	023	-024	052	-026	022	046	060	014	020	004	-035	136*	-049
33	CNN Need Achievement	170	0	-117*	-030	027	126*	-161*	-131*	-019	-585**	-006	035	-097	043	-088	010
34	CNN Need Aggression	171	034	-003	-036	-058	236*	-193*	-282*	017	035	028	-060	0	112*	-341**	117*
35	CNN Aggressive Anxiety	168	-046	056	-006	017	-043	114*	070	-017	-497**	-004	053	048	041	163*	020
36	Family Social Status(Signs Reversed)	62	-011	- 0	094	-061	104*	-023	299**	129*	-256*	024	-075	-023	-126*	010	126*
37	NOM Wheel	70	184*	024	-030	008	-020	-020	044	053	014	014	024	-234**	099	070	009
38	NOM Brain	71	219**	057	046	-027	-011	-061	040	010	052	-053	032	062	039	-072	-007
39	NOM Quiet One	75	038	-036	-039	024	096	-064	-076	-010	031	-034	-039	572**	-036	009	034
40	NOM Wild One	76	117*	-019	-052	219**	0	011	-013	-097	012	-106*	-022	-180*	-134*	109*	009
41	NOM Left Out	77	-110*	018	052	229**	-074	005	-023	023	-025	037	0	155*	030	-098	-004
42	NOM Behavior Model	89	050	-009	-027	-081	011	0	-015	532**	023	-066	006	-011	-084	011	0
43	NOM Neg. Behavior Model	90	-063	0	0	061	-022	013	-034	528**	025	-052	0	0	0	-019	-031
44	NOM Academic Model	82	240**	005	-029	-046	007	-027	-011	013	058	-024	012	128*	097	-007	-023
45	NOM Neg. Academic Model	83	-109*	-013	024	220**	-036	-026	024	050	015	062	005	085	154*	0	0
46	NOM Active	85	188**	024	-032	013	0	-024	028	037	0	0	057	-118*	080	082	022
47	NOM Passive (Avoidant)	86	078	-065	015	147*	043	037	117*	-060	-016	-018	019	259**	118*	182*	-037
48	NOM Impulsive	98	0	-031	-017	252**	0	-014	-048	-020	-017	0	-045	-019	047	-013	022
49	NOM Affective Neutrality	99	175*	-036	-072	005	062	-009	-024	-019	-013	028	0	191**	-008	0	-017
50	NOM Imaginative	72	282**	034	005	091	004	014	0	-136*	-054	-148*	051	-108*	-147*	0	027
51	NOM Daydreamer	73	059	030	035	241*	-045	063	016	-111*	-039	-040	016	-038	-277**	-033	-010
52	NOM Amoral	176	051	006	0	-004	006	028	022	-044	-063	-071	049	-023	706**	064	-020
53	NOM Expedient	177	-127*	017	-050	041	-038	-050	-062	-076	054	354**	-007	-206*	084	-064	-012
54	NOM Conforming	178	-114*	0	-018	-005	028	030	007	-058	0	367**	0	-044	-040	-026	0
55	NOM Conscientious	179	-085	011	029	0	007	-023	038	-049	0	326**	020	085	-113*	-055	-008
56	NOM Rational Altruistic	180	-056	014	-013	-036	0	006	046	-009	0	313**	006	068	-088	015	-018
57	Age-Mate IPS	64	255**	-011	-062	-091	035	062	-055	-055	053	-137*	-059	030	-016	-142*	006

TABLE 5.14

Factor Loadings and Regression Weights for Appropriate Predictor Measures Describing Fifteen Factors as Dimensions of Behavior Among 1570 Students in the Seventh Grade at Four Texas Communities in the Human Talent Research Project.

(N = 1570)

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
I. Age-Mate Acceptance	72	NOM Imaginative	635**	282**
	64	Age-Mate IPS	532**	255**
	82	NOM Academic Model	697**	240**
	71	NOM Brain	659**	219**
	85	NOM Active	659**	188**
	70	NOM Wheel	598**	184**
	99	NOM Affective Neutrality	608**	175*
	76	NOM Wild One	215	117*
	83	NOM Negative Academic Model	-149	-109*
	77	NOM Left Out	-185	-110*
	178	NOM Non-Conforming	207	-114*
	177	NOM Expedient	124	-127*
II. Neurotic Anxiety	34	CYS Social Inadequacy	814**	382**
	32	CYS Personal Maladjustment	813**	370**
	25	CYS CMAS Anxiety	677**	213**
	31	CYS Self Inadequacy	612**	195*
	39	JPQ-1 Emotional Sensitivity	270*	151*
	41	JPQ-3 Neurotic vs. Ego Strength	466**	116*
	48	JPQ-10 Energetic Conformity	-282*	-115*
	70	CNN Need Achievement	-096	-117*
III. Convergent Thinking	143	DAT Mechanical Reasoning	731**	237**
	16	Gestalt Transformation	679**	231**
	161	DAT Space Relations	672**	228**
	1	CTMM Mental Function	700**	192**
	22	GFT Unusual Uses	605**	161**
	13	STEP Listening	614**	156**
	21	GFT Rhymes	602**	148*
	23	GFT Common Situations	150	-117*
IV. Peer Evaluated Impulsivity	98	NOM Impulsivity	781**	252**
	73	NOM Daydreamer	663**	241*
	77	NOM Left Out	686**	229**
	83	NOM Negative Academic Model	722**	220**
	76	NOM Wild One	643**	219**
	86	NOM Passive (Avoidant)	442**	147*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
X. "Peer Visibility"	178	NOM Conforming	764**	367**
	177	NOM Expedient	715**	354**
	179	NOM Conscientious	717**	326**
	180	NOM Rational Altruistic	740**	313**
	76	NOM Wild One	-103	-106*
	64	Age-Mate IPS	-008	-137*
	72	NOM Imaginative	026	-148*
XI. Divergent Thinking	23	GFT Common Situations	798**	483**
	24	GFT Consequences	757**	430**
	20	GFT Seeing Problems	686**	357**
	161	DAT Space Relations	-051	-156*
XII. Peer Isolation	75	NOM Quiet One	784**	572**
	86	NOM Passive (Avoidant)	330*	259**
	99	NOM Affective Neutrality	260*	191**
	77	NOM Left Out	225	155*
	82	NOM Academic Model	177	128*
	41	JPQ-3 Neurotic vs. Ego Strength	121	113*
	32	CYS Personal Maladjustment	-078	-100*
	72	NOM Imaginative	-134	-108*
	85	NOM Active	-155	-118*
	44	JPQ-6 Cyclo vs. Schizothymia	-109	-136*
	76	NOM Wild One	-287*	-180*
	177	NOM Expedient	-278*	-206*
	70	NOM Wheel	-321*	-234**
XIII. Amoral Self-gratification	176	NOM Amoral	809**	706**
	83	NOM Negative Academic Model	234	154*
	86	NOM Passive (Avoidant)	145	118*
	171	CNN Need Aggression	169	112*
	13	STEP Listening	140	101*
	179	NOM Conscientious	-113	-113*
	62	Family Social Status (SR)	-129	-128*
	76	NOM Wild One	-126	-134*
	72	NOM Imaginative	-186	-147*
	26	CYS Critic of Education	-179	-152*
	73	NOM Daydreamer	-297*	-277**
XIV. Reactive Passivity	58	PMT Dotting Test	505**	372**
	142	DAT Clerical Speed & Accuracy	451**	304**
	61	DRT Discrimination	369*	250**
	26	CYS Critic of Education	258*	244**
	17	Gestalt Completion	365*	235**
	86	NOM Passive (Avoidant)	047	182*
	168	CNN Aggressive Anxiety	206	163*
	161	DAT Space Relations	212	136*
	31	CYS Self Inadequacy	129	136*
	30	CYS Negative Social Orientation	122	132*
	76	NOM Wild One	113	109*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
V. Competence Motivation	44	JPQ-6 Cyclo vs. Schizothymia	523**	258**
	42	JPQ-4 Will Control vs. Relaxed	611**	234**
	51	SSHA Scholastic Motivation	581**	233**
	39	JPQ-1 Emotional Sensitivity	415**	217**
	62	Family Social Status (SR)	-081	-104*
	170	CNN Need Achievement	-019	-126*
	41	JPQ-3 Neurotic vs. Ego Strength	-465*	-156**
	26	CYS Critic of Education	-439**	-171*
	171	CNN Need Aggression	-521**	-236*
	47	JPQ-9 Independent Dominance	-601**	-247**
VI. Energetic Awareness	49	JPQ-11 Surgency vs. Desurgency	769**	537**
	48	JPQ-10 Energetic Conformity	583**	416**
	39	JPQ-1 Emotional Sensitivity	197	183*
	27	CYS Critic of Youth	025	135*
	13	STEP Listening	174	117*
	168	CNN Aggressive Anxiety	131	114*
	143	DAT Mechanical Reasoning	117	-116*
	170	CNN Need Achievement	-225	-161*
	171	CNN Need Aggression	-176	-193*
	42	JPQ-4 Will Control vs. Relaxed	-418	-270**
VII. Symbol Aptitude	14	KRT Short Words	652**	432**
	18	KRT Mutilated Words	627**	393**
	171	CNN Need Aggression	237	282*
	21	GFT Rhymes	360*	184*
	26	CYS Critic of Education	169	164*
	170	CNN Need Achievement	167	131*
	142	DAT Clerical Speed & Accuracy	331*	127*
	17	Gestalt Completion	284*	105*
	86	NOM Passive (Avoidant)	-106	-117*
	143	DAT Mechanical Reasoning	-100	-126*
	47	JPQ-9 Independent Dominance	-257*	-186*
	62	Family Social Status (SR)	-281*	-299**
VIII. Peer Stimulus Value	89	NOM Behavior Model	818**	532**
	90	NOM Negative Behavior Model	816**	528**
	62	Family Social Status (SR)	235	129*
	73	NOM Daydreamer	-096	-111*
	72	NOM Imaginative	-109	-136*
IX. Status Anxiety	170	CNN Need Achievement	772	585**
	168	CNN Aggressive Anxiety	704**	497**
	62	Family Social Status (SR)	306*	256*
	47	JPQ-9 Independent Dominance	119	153*
	41	JPQ-3 Neurotic vs. Ego Strength	097	112*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
XIV. (Cont.)	51	SSHA Scholastic Motivation	-070	-121*
	1	CTMM Mental Function	-027	-125*
	64	Age-Mate IPS	-083	-142*
	22	GFT Unusual Uses	-074	-151*
	21	GFT Rhymes	-070	-185**
	171	CNN Need Aggression	-399*	-341**
XV. Authoritarian Socialization or Alienation Syndrome	27	CYS Critic of Youth	769**	498**
	29	CYS Authoritarian Discipline	729**	447**
	30	CYS Negative Social Orientation	586**	310**
	25	CYS CMAS Anxiety	349*	103*
	34	CYS Social Inadequacy	011	-113*
	171	CNN Need Aggression	-086	-117*
	32	CYS Personal Maladjustment	021	-121*
	62	Family Social Status (SR)	-267*	-126*

when there is substantial intercorrelation among predictors, a phenomenon quite evident in Table 5.14 when factor loadings are compared with the weights in the right-hand columns.

Table 5.15 shows the triangular matrix of intercorrelations among the seventh-grade predictors. None of the correlation coefficients is large. For all practical purposes the fifteen factor variables are orthogonal; that is, they are independent of one another.

Table 5.16 (the factor loadings of nine ninth-grade factor variables obtained from intercorrelations of 39 predictor measures), 5.17 (the regression weights obtained when linear restraints are removed by a procedure equivalent to "sweeping out" the right-triangular matrix of correlations or pivotal condensation of the triangular correlation matrix upon each of the vectors of factor loadings in turn), 5.18 (the description of each of the nine ninth-grade factors), and 5.19 (demonstrating the relative independence of ninth-grade factors) mostly are counterparts from the ninth-grade data of Tables 5.12 to 5.17 for the 57 seventh-grade predictor variables.

A methodological note.- The foregoing steps could be regarded as computer analogs of earlier laborious computations on the Monroe calculator using procedures worked out in the Laboratory of Human Behavior. The pivotal condensation of a right-hand triangular correlation matrix as suggested by Rao (1952) provided a basis for the "sweep-out" technique described in the memorandum McGuire (1956a) finally had to prepare for graduate students and research personnel. The procedure had been used in the work summarized in "The Textown Study of Adolescence" by McGuire (1956b) and in an APA paper (Brown, Holtzman, & McGuire, 1955). Moving from the Monroe calculators to a Card Programmed Computer (CPC), then to IBM 650 equipment, next the CDC 1604 system, and now a large CDC 6600 installation

TABLE 5.15

INTERCORRELATION OF SEVENTH GRADE PREDICTOR VARIABLES

No.	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Age-Mate Acceptance	1.0	02	03	09	03	-07	-06	25	13	14	01	16	22	-12	-11
2	Neurotic Anxiety		1.0	-03	-06	-05	07	02	01	-06	02	-06	01	-03	11	11
3	Convergent Thinking			1.0	08	00	-13	-13	-07	11	-06	22	04	-05	-22	-17
4	Peer-evaluated Impulsivity				1.0	03	-08	-03	03	-04	07	00	03	12	-17	-11
5	Competence Motivation					1.0	-03	-04	02	05	-03	03	08	00	-07	-08
6	Energetic Awareness						1.0	11	-16	-03	02	-01	-04	-12	10	10
7	Symbol Aptitude							1.0	-10	07	-06	-04	-05	-04	08	01
8	In-groupness								1.0	16	20	08	15	37	-03	-18
9	Status Anxiety									1.0	04	-02	00	06	-01	05
10	Peer Visibility										1.0	05	-10	12	07	-08
11	Divergent Thinking											1.0	07	-02	-07	02
12	Peer Isolation												1.0	-01	-08	-07
13	Amoral Self-gratification													1.0	-14	-06
14	Reactive Passivity														1.0	13
15	Alienation Syndrome															1.0

TABLE 5.16

Varimax Factor Structure of 39 Dimensional Variables (Predictor Measures)

in Ninth-Grade Year at Four Community Locations of the

Human Talent Research Program (N = 1464)

(Entries rounded, no decimal points; "**" designates highest loading in row, "*" other major loadings)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	h^2
1	CTMM Intelligence	212	724**	169	-054	-108	-230	-016	044	-048	015	624
2	STEP Listening	225	733**	180	-019	-111	-267*	113	219	-029	011	715
3	Gestalt Transformation	279	702**	089	057	-121	-181	-185	009	-030	034	588
4	DAT Abstract Reason	160	734**	142	-075	-077	-156	-002	042	-134	-118	628
5	DAT Space Relations	161	736**	129	-008	-064	-005	-042	008	006	-103	576
6	GFT Unusual Uses	284	549**	128	006	-060	-406*	100	091	-003	034	505
7	GFT Consequences	283	281*	122	019	-025	-696**	-017	038	044	013	583
8	GFT Com. Situations	282	350*	140	-023	-085	-660**	-045	053	-041	063	596
9	GFT Seeing Problems	285	344*	060	-007	-075	-648**	031	030	010	111	562
10	KRT Mutilated Words	280	075	138	-080	-082	-646**	064	-002	-229	-067	515
11	KRT Short Words	281	095	055	005	-062	-630**	083	-051	-159	-056	451
12	JPQ-1 Em. Sensitivity	267	-161	035	014	219	-086	758**	-070	-043	-020	665
13	JPQ-11 Surgency	270	-025	-099	030	264	-290*	096	372**	-291*	087	404
14	SSHA Schol. Motiv'n	256	255*	200	-083	-504**	-226	410	-072	012	058	593
15	CMAS Anxiety	263	-159	-075	006	749**	059	-010	-255*	-045	-066	666
16	CYS Authoritarian	265	-196	-060	-008	064	172	-026	-759**	069	-075	663
17	CYS Critic of Youth	266	-074	-038	-006	217	-076	100	-747**	-049	-004	630
18	CYS Neg. Soc. Orient'n	264	-415*	-119	022	335*	062	-322*	-487**	022	-090	653
19	CYS Pers. Maladjustment	258	-074	-044	029	766**	162	074	-081	164	-090	669
20	CYS Social Inadequacy	257	-109	-028	051	797**	098	-129	-044	012	036	680
21	NNA Achievement	260	-076	-063	021	646**	-056	128	033	042	102	460
22	NNA Aggression	261	-034	-072	082	453*	032	-602**	017	-028	078	589
23	NNA Aggression Anxiety	259	-019	093	-061	-058	-148	158	-412**	036	259*	300
24	ISS Family Status (Signs Reversed)	371	472	080	-045	-091	-166	030	129	-248	022	347
25	P-NOM Brain	364	193	874**	072	-046	-072	-013	-015	083	013	821
26	P-NOM Quiet One	346	162	048	501	046	175	334*	-071	-007	-480**	660
27	P-NOM Left Out	348	012	-014	891**	057	055	066	012	-012	-057	808
28	P-NOM Behavior Model	340	085	436*	191	-123	-152	-056	017	-610**	-243	706
29	P-NOM Neg. Beh. Model	341	-104	008	864**	044	-064	-080	037	-150	124	810
30	P-NOM Academic Model	356	111	818**	-057	-117	-171	041	006	-228	-089	789
31	P-NOM Neg. Academic Model	358	-125	027	657**	066	054	-180	046	018	437*	681
32	P-NOM Copes with Difficulty	363	149	926**	-016	-074	-108	-016	022	-121	016	912
33	P-NOM Avoids Failure	357	140	943**	-005	-061	-112	053	010	-062	-010	932
34	P-NOM Imaginative	344	194	476**	292	-146	-206	-121	024	-449*	-182	663
35	P-NOM Amoral	176	-026	-025	171	022	046	006	-012	-189	677**	528
36	P-NOM Expedient	177	081	158	143	-050	-133	-051	-011	-654**	402*	664
37	P-NOM Conforming	178	106	241	-031	-023	-096	042	065	-763**	136	686
38	P-NOM Conscientious	179	215	621**	019	-013	-029	099	-000	-380*	153	611
39	P-NOM Rat'l Altruistic	180	149	622**	-080	-036	-073	187	052	-474*	069	689

TABLE 5.17

Modal Values for 39 Dimensional Variables (Predictors) Over 9 Factors for Students in Ninth-Grade Year in Four Community Locations of the Human Talent Research Program (N = 1464)

(Entries rounded, no decimal points; "**" denotes highest modal value in row; "*", other significant values)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX
1	CTMM Intelligence	212	235**	-021	-006	024	041	-013	-054	010	040
2	STEP Listening	225	212**	-012	0	054	023	062	048	038	034
3	Gestalt Transformation	279	239**	-042	032	0	052	-118*	-091	007	038
4	DAT Abstract Reason	160	245**	-063	-024	044	082	-006	-057	-067	-061
5	DAT Space Relations	161	290**	-029	004	033	150*	-030	-079	0	-029
6	GFT Unusual Uses	284	122**	-017	021	041	-087	049	0	064	039
7	GFT Consequences	283	-048	006	042	030	-316**	-055	0	130*	-018
8	GFT Com. Situations	282	-012	0	010	006	-264**	-066	-004	079	010
9	GFT Seeing Problems	285	0	-017	019	010	-254**	-005	-017	090	064
10	KRT Mutilated Words	280	-127*	-019	-021	-006	-292**	-014	-004	-063	-110
11	KRT Short Words	281	-092	-044	016	-007	-290**	005	-043	-030	-092
12	JPQ-1 Em. Sensitivity	267	-040	-004	014	112*	-026	509**	010	-010	027
13	JPQ-11 Surgency	270	-075	-066	-015	130*	-126*	078	233**	-140*	-005
14	SSHA Schol. Motiv'n	256	021	0	0	-141*	-017	234**	-095	060	097
15	CMAS Anxiety	263	030	0	-035	260**	-009	027	-077	-058	-044
16	CYS Authoritarian	265	042	-010	012	-049	041	-033	-436**	-030	-019
17	CYS Critic of Youth	266	068	-044	004	025	-037	058	-436**	-065	016
18	CYS Neg. Soc. Orient'n	264	-082	0	0	030	-091	-212*	-232**	-046	-109*
19	CYS Pers. Maladjustment	258	077	037	0	285**	046	092	023	065	-023
20	CYS Social Inadequacy	257	041	040	-017	290**	005	-023	038	005	018
21	NNA Achievement	260	018	014	-019	259**	-041	135*	076	042	094
22	NNA Aggression	261	030	019	-004	133*	-023	-364**	021	-007	011
23	NNA Aggression Anxiety	259	021	024	-012	-034	-045	103*	-258**	065	246*
24	ISS Family Status	371	-147**	070	031	-016	-046	-018	-008	124*	-008
25	P-NOM Brain	364	-034	269**	022	042	004	-052	0	241	064
26	P-NOM Quiet One	346	093	-030	237*	015	093	214*	-042	-033	-340*
27	P-NOM Left Out	348	018	-014	383**	-004	0	062	0	048	-058
28	P-NOM Behavior Model	340	-053	0	044	-040	-011	-074	-011	-301**	-275*
29	P-NOM Neg. Beh. Model	341	-038	-004	361**	-039	-068	-020	0	0	018
30	P-NOM Academic Model	356	-089	200**	-034	0	-024	-038	006	011	-056
31	P-NOM Neg. Academic Model	358	-014	042	254*	-008	0	-061	012	128*	307*
32	P-NOM Copes with Difficulty	363	-044	269**	-004	005	0	-028	016	120*	028
33	P-NOM Avoids Failure	357	-036	285**	0	015	0	0	036	125*	012
34	P-NOM Imaginative	344	-022	030	101*	-036	-042	-131*	-013	-160*	-198*
35	P-NOM Amoral	176	055	-014	033	0	087	067	-045	-030	503*
36	P-NOM Expedient	177	025	-074	0	-010	041	-011	-069	-306**	233*
37	P-NOM Conforming	178	016	-069	-080	007	069	024	0	-407**	017
38	P-NOM Conscientious	179	042	115*	-022	032	107*	060	-019	-096	[illegible]
39	P-NOM Rat'l Altruistic	180	0	088	-073	049	067	099	011	-157**	037

TABLE 5.18

Factor Loadings and Regression Weights for Appropriate Predictor Measures Describing Nine Factors as Dimensions of Behavior among 1464 Students in the Ninth Grade at Four Texas Communities of The Human Talent Research Program (HTRP)
(N = 1464)

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
I. Convergent Thinking	161	DAT Space Relations	736**	290**
	160	DAT Abstract Reasoning	734**	245**
	279	Gestalt Transformation	702**	239**
	212	CTMM Intelligence	724**	235**
	225	STEP Listening	733**	212**
	371	ISS Family Status	472**	147**
	284	GFT Unusual Uses	549**	122**
	280	KRT Mutilated Words	075	-127*
II. Peer Evaluated Brain	357	P-NOM Avoids Failure	943**	285**
	364	P-NOM Brain	874**	269**
	363	P-NOM Copes with Difficulty	926**	269**
	356	P-NOM Academic Model	818**	200**
	179	P-NOM Conscientious	621**	115*
III. Peer Evaluated Isolation	348	P-NOM Left-Out	891**	383**
	341	P-NOM Negative Behavior Model	864**	361**
	358	P-NOM Negative Academic Model	657**	254*
	346	P-NOM Quiet One	501**	237*
	344	P-NOM Imaginative	292*	101*
IV. Neurotic Anxiety	257	CYS Social Inadequacy	797**	290**
	258	CYS Personal Maladjustment	766**	285**
	263	CMAS Anxiety	749**	260**
	260	NNA Achievement	646**	259**
	261	NNA Aggression	453*	133*
	270	JPQ-11 Surgency vs. Desurgency	264*	130*
	267	JPQ-1 Emotional Sensitivity	219	112*
	256	SSHA Scholastic Motivation	-504**	-141*
V. Divergent Thinking	283	GFT Consequences	696**	316**
	280	KRT Mutilated Words	646**	292**
	281	KRT Short Words	630**	290**
	282	GFT Common Situations	660**	264**
	285	GFT Seeing Problems	648**	254**
	270	JPQ-11 Surgency vs. Desurgency	290*	126*
	161	DAT Space Relations	005	-150*
	179	P-NOM Conscientious	029	-107*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
VI. Competence Motivation	267	JPQ-1 Emotional Sensitivity	758**	509**
	256	SSHA Scholastic Motivation	410*	234**
	346	P-NOM Quiet One	335*	214*
	260	NNA Achievement	128	135*
	259	NNA Aggression Anxiety	158	103*
	279	Gestalt Transformation	-185	-118*
	344	P-NOM Imaginative	-121	-131*
	264	CYS Negative Social Orientation	-322*	-212*
	261	NNA Aggression	-602**	-364**
VII. Alienation Syndrome	266	CYS Criticism of Youth	747**	436**
	265	CYS Authoritarian	759**	436**
	259	NNA Aggression Anxiety	412**	258**
	264	CYS Negative Social Orientation	487**	232**
	270	JPQ-11 Surgency vs. Desurgency	-372**	-233**
VIII. Peer Visibility	178	P-NOM Conforming	763**	407**
	177	P-NOM Expedient	654**	306**
	340	P-NOM Behavior Model	610**	301**
	344	P-NOM Imaginative	449*	160*
	180	P-NOM Rational Altruistic	474*	157*
	270	JPQ-11 Surgency vs. Desurgency	291*	140*
	371	ISS Family Status	249	124*
	363	P-NOM Copes with Difficulty	121	-120*
	357	P-NOM Avoids Failure	062	-125*
	358	P-NOM Negative Academic Model	018	-128*
	283	GFT Consequences	044	-130*
	364	P-NOM Brain	083	-241*
IX. Peer Evaluated Impulsivity	176	P-NOM Amoral	677**	503**
	358	P-NOM Negative Academic Model	437*	307**
	259	NNA Aggression Anxiety		246*
	177	P-NOM Expedient	403*	233*
	179	P-NOM Conscientious	153	120**
	264	CYS Negative Social Orientation	-090	-109*
	280	KRT Mutilated Words	-067	-110*
	344	P-NOM Imaginative	-182	-198**
	340	P-NOM Behavior Model	125	-275*
	346	P-NOM Quiet One	-480*	-340**

TABLE 5.19

INTERCORRELATION OF NINTH GRADE PREDICTOR VARIABLES

No.	Variable	16	17	18	19	20	21	22	23	24
16	Convergent Thinking (I)	1.0	00	04	04	11	-04	-11	04	05
17	Peer-evaluated Brain (II)		1.0	-07	04	03	-00	03	04	03
18	Peer-evaluated Isolation (III)			1.0	08	02	04	-07	13	11
19	Neurotic Anxiety (IV)				1.0	-02	06	04	-06	-06
20	Divergent Thinking (V)					1.0	03	02	-05	-06
21	Competence Motivation (VI)						1.0	11	04	02
22	Alienation Syndrome (VII)							1.0	-01	-04
23	Peer Visibility (VIII)								1.0	-22
24	Peer-evaluated Impulsivity (IX)									1.0

has been accompanied by evolutionary changes in underlying statistical models for the computer programs employed. The early "piecemeal" factor-analytic and multiple regression procedures employed in the analysis of HTRP data (McGuire, Hindsman, King, & Jennings, 1961) have been described in greater detail in published reports (McGuire & Associates, 1960; McGuire, 1961a, 1961b). They gave way to CDC 1604 Program ABSTRAC which accepted raw data from IBM cards or tape locations, computed intercorrelations, carried out principal-axis factor analysis, performed varimax rotation, used an iterative procedure to obtain regression weights (Tables 5.13 and 5.17), to replace factor loadings (Tables 5.12 and 5.16), and to compute factor scores (Jennings & Veldman, 1963). To obtain the tabled material included in this chapter, output statements were employed for all except Tables 5.14 and 5.18 which required judgments during the selection of representative entries to illustrate the elements (variables) contributing to each of the Gestalten and to "name" the PA (Grade VII) and EA (Grade IX) factor variables. A number of programs in the books by Veldman (1967) and by Kelly, Beggs, & McNeil (1969) can be traced back to the developmental process indicated in this paragraph. Even the canonical correlation analysis (probably the most general statistical model) discussed by Veldman (pp. 282ff., including Program CANONA) and by Kelly et al. (pp. 244-248, including Figure 7-4, "Interrelationship of various statistical techniques") can be traced back to Jones' dissertation (1964) when the three men, along with Jennings, Whiteside, and Foster, were providing reciprocal stimulation for one another in the Laboratory of Human Behavior and the Personality Research Center (R. F. Peck, Director).

Transformation of PA (Grade VII) to EA (Grade XI) Gestalten.- The pubescent **transformation** hypothesis predicts a shift in the composition of Gestalten when the seventh-grade (PA) and ninth-grade (EA) factor variables are compared. The relevant data are the "repeated observations" in the form of factor scores for persons present for both sets of observations used to compute the correlations between 15 seventh-grade (Nos. 1 to 15) and nine ninth-grade factor variables (Nos. 16 to 24) recorded in Table 5.20. The only correlation coefficien in the table which indicates pairs of computed factor scores have more than 50 per cent common variance is $r = .71$, $r^2 = .5041$, the correlation between seventh-grade factor variable No. 16, Gestalten which share the same name "Convergent Thinking," with selected elements of the factor structures displayed in Table 5.14, page 5-42, for the PA configuration. Whereas DAT Mechanical Reasoning made the largest contribution to the OA structure (.237), its ninth-grade counterpart, DAT Abstract Reasoning (.245) was second in the EA structure. (Note: the substitution of DAT Abstract Reasoning for DAT Mechanical Reasoning followed an analysis which revealed that girls were being penalized by use of the "mechanical" symbols in a DAT reasoning instrument.) The measures (or "elements") common to the "repeated observations" configureations were DAT Space Relations (regression weights .290 for the PA and .231 for the EA Gestalten), CTMM Mental Function, and STEP Listening. The regression weights, however, vary from computations for the PA to the EA administration. The substantial negative correlation coeffieient between PA variable No. 10 and EA variable 23 ($r = -.69$), both named "Peer Visibility," is a function of the positive and negative weights in the vectors derived from the two sets of data. Aside from peer nominations as "Conforming" and "Expedient," common to the PA and EA configurations, there has been a noticeable transformation in what elements (and weights) define the factor variable in prepubertal (PA) and post-pubescent (EA) years.

The hypothesis of a pubescent transformation from 15 PA to only 9 EA factor variables does not require much further detailed examination of the tables supporting Table 5.20 when one underlines and looks at the correlation coefficients using $r = .20$ or greater as an arbitrary cut-off point. The nine ninth-grade

TABLE 5.20

INTERCORRELATION OF SEVENTH GRADE AND NINTH GRADE PREDICTOR VARIABLES

		Variable - 9th Grade								
		Convergent Thinking	Peer-evaluated Brain	Peer-evaluated Isolation	Neurotic Anxiety	Divergent Thinking	Competence Motivation	Alienation Syndrome	Peer Visibility	Peer-evaluated Impulsivity
No.	**Variable - 7th Grade**	16	17	18	19	20	21	22	23	24
1	**Age-Mate Acceptance**	04	43	-11	-08	-00	-05	02	-19	01
2	**Neurotic Anxiety**	-01	08	07	49	-02	14	02	-01	-07
3	**Convergent Thinking**	71	13	04	-03	-03	-18	-04	17	-06
4	**Peer-evaluated Impulsivity**	-03	-10	38	01	01	-10	-01	-11	26
5	**Competence Motivation**	-07	-07	-10	29	14	-45	-01	-07	-09
6	**Energetic Awareness**	-10	-05	-07	10	-05	25	28	-17	01
7	**Symbol Aptitude**	-09	-07	07	-05	33	-01	13	10	01
8	**Peer Stimulus Value**	-05	20	07	02	05	06	04	-09	-06
9	**Status Anxiety**	04	05	-01	-03	09	-20	24	00	-13
10	**Peer Visibility**	03	45	-07	06	04	08	05	-69	42
11	**Divergent Thinking**	08	09	04	-02	50	03	04	-02	-11
12	**Peer Isolation**	06	21	04	19	16	33	09	29	-34
13	**Amoral Self-gratification**	-01	-05	17	-06	-00	-01	07	-14	39
14	**Reactive Passivity**	-01	04	-15	01	-05	12	00	-14	-10
15	**Alienation Syndrome**	00	-03	04	-03	03	02	34	04	-04

r = .12, ** p .01; r = .01, * p .05

"early adolescent" Gestalten are made up of elements previously incorporated in the 15 "preadolescent" factor variables. For example, early-adolescent No. 17 "Peer-evaluated Brain," reported in earlier studies of age-mate studies as the "Brain" reference group by McGuire (1953), has statistically significant relationships (that is, structural elements in common) with preadolescent No. 1 "Age-mate Acceptance," No. 8 "Peer Stimulus Value," and No. 10 "Peer Visibility." EA No. 18 "Peer-evaluated Isolation" (that is, the "isolate" set of boys and girls identifiable at the sociographic level in Chapter III) is most closely related to preadolescent No. 4 "Peer-evaluated Impulsivity," an understandable antecedent form of behavior. EA No. 19 "Neurotic Anxiety" has 24 per cent common variance with PA No. 2 bearing the same name ($r = .49$) plus some elements of PA No. 5 "Compentence Motivation." Next, EA No. 20 "Divergent Thinking" embodies both PA No. 7 "Symbol Aptitude" and No. 11 "Divergent Thinking," with which it shares 25 per cent common variance ($r = .50$). EA No. 21 "Competence Motivation," not only bears an overall negative relationship ($r = -.45$) to the PA No. 5 variable of the same name when all weights of elements are used to compute factor scores but also have SSHA Scholastic Motivation (.233 with .234), and JPQ 1 Emotional Sensitivity (.217 with .509) being the two variables common to the Pretest and Posttest forms (PA and EA Beta weights shown).

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APPENDIX A

DESCRIPTION OF VARIABLES

The number appearing in front of the test variable is for cross reference use with Table 5.1 which lists all tests given from Grade VII to Grade XII with Master File Numbers (MFN), Form of Instrument, and Number of Subjects (N).

Criterion Measures

Academic Achievement

Annual Measures

001 GPA Teacher Evaluation. Grade point average derived from teacher evaluations of performance in content subjects [(a) English, (b) social studies, (c) mathematics, (d) science] for each student during the school year. Grade point averages were computed on a fifteen point scale. The fifteen point scale transformation representing either letter grades of the typical 100 point scale follows.

15-point scale	Letter Grade	100-point scale
15	A+	97-100
14	A	93-96
13	A-	90-92
12	B+	87-89
11	B	83-86
10	B-	80-82

15-point scale (contd.)	Letter Grade	100-point scale
9	C+	77-79
8	C	73-76
7	C-	70-72
6	D+	67-69
5	D	63-66
4	D-	60-62
3	F+	40-59
2	F	20-39
1	F-	0-19

002 CAT Reading. Grade placement scores from California Achievement Tests; different forms used in various grades; two subtests: (a) vocabulary (mathematics, science, social studies, general) and (b) comprehension (following directions, reference skills, interpretations).

003 CAT Language. Grade placement scores from California Achievement Tests; different forms in various grades; two subtests: (a) mechanics of English (capitalization, punctuation, word usage) and (b) spelling.

004 CAT Arithmetic. Grade placement scores from California Achievement Tests; different forms in different grades; two subtests: (a) fundamentals (addition, subtraction, multiplication, division) and (b) reasoning (meanings, symbols, rules, equations, problems).

005 STEP Mathematics. The test is designed to provide an instrument for the overall evaluation of an individual or a class with respect to achievement in the broad mathematical objectives of education. The concepts tested are classified as number and operation, symbolism, measurement and geometry, function and rela-

tion, proof: deductive and inferential reasoning, probability and statistics (Cooperative Test Division, 1958).

006 STEP Science. The test is designed to measure two aspects of science education. The two aspects are 1) that the student should acquire knowledge of basic scientific concepts in each major area of science, and 2) that the student should acquire problem solving skills which he needs in the application of scientific knowledge to familiar and unfamiliar situations. The test is limited to the content of the "average" curriculum. The skills tested include 1) the ability to identify and define a scientific problem, 2) the ability to suggest or screen hypotheses, 3) the ability to select validating procedures, 4) the ability to interpret data and draw conclusions, 5) the ability to evaluate critically the claims or statements of others, 6) the ability to reason quantitatively and symbolically (Cooperative Test Division, 1958).

007 STEP Social Studies. The test is designed to test the students' understanding of 1) the nature of social change and its effect on man's way of living, 2) the effects of geographic environment on man's institutions and ways of living, 3) control over the forces of nature as a major factor in accounting for the ways in which we live today, 4) the nature of a democtatic society and the rights, privileges, and responsibilities of free men, 5) the means by which society directs and regulates the behavior of its members, 6) man's economic wants and ways of satisfying them, 7) the ways in which man attempts to understand and adjust to his environment and his place in the universe, 8) the interdependence among individuals, communities, societies, regions, and nations, 9) the sources of human nature and personality (Cooperative Test Division, 1958).

Dimensional Measures

Age-Mate Appraisals

010 IPS Peer Status. Index values computed in grades VII, VIII, and IX from sociographically-weighted positive and negative valuations of members of the age-mate society by peers at each school location after a matrix analysis of the sociometric nominations (McGuire and Clark, 1952; McGuire, White, and Murphy, 1960).

011 Peer-Nomination: Wheel. Number of times named by age-mates in response to "Name three persons about your age who sort of 'make the wheels go round.' They are the boys and girls who tend to run things wherever they are. 'They're tops.'"

012 Peer-Nomination: Brain. Number of times named by age-mates in response to "Name three persons about your age who are sort of 'brains.' They are boys or girls who get their ideas from books. They tend to do what older people want."

014 Peer-Nomination: Quiet Ones. Number of times named by age-mates in response to "Name three persons about your age who are sort of quiet. They're often forgotten or just not noticed."

015 Peer-Nomination: Wild Ones. Number of times named by age-mates in response to "Name three persons about your age who are sort of 'wild ones.' They are boys and girls who could get into trouble."

016 Peer-Nomination: Left Out. Number of times named by age-mates in response to "Name three persons about your age who are 'left out' of things on purpose. They make other people feel uncomfortable."

017 Peer-Nomination: Behavior Model. Number of times named by age-mates in response to "Name three persons you would like to be like."

018 Peer-Nomination: Academic Model. Number of times named by age-mates in response to "Name three persons you could work with, or ask for help, on a school problem."

019 Peer-Nomination: Active. Number of times named by age-mates in response to "Name three persons about your own age who are active in making things come out the way they want them to be. They know what they want and do something about it."

020 Peer-Nomination: Passive. Number of times named by age-mates in response to "Name three persons about your own age who tend to wait and let things happen to them. They are boys and girls who avoid trouble when difficulties arise."

021 Peer-Nomination: Impulsive. "Name three persons about your age who do many things without thinking. They 'don't care' but sometimes they are sorry."

022 Peer-Nomination: Affective Neutrality. Number of times named by age-mates in response to "Name three persons about your own age who think of what might happen before they do anything so they won't feel ashamed of what they have done."

026 Peer-Nomination: Imaginative. Number of times named by age-mates in response to "Name three people about your own age who have good imaginations. They have new ideas and new ways of doing things."

027 Peer-Nomination: Daydreamer. Number of times named by age-mates in response to "Name three people about your own age who daydream a great deal. The things they dream and think about often do make sense."

029 Peer-Nomination: Artist. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding ability" by age-mates in the school locations.

030 Peer-Nomination: Athletic. Transformed distribution of values based upon frequency of nominations of persons "who are really good in athletics and sports" by age-mates in the school location.

032 Peer-Nomination: Mechanical. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding mechanical ability, who have real understanding of tools and machines," and who "build and repair things and really know how things work" by age-mates in the school location.

033 Peer Nomination: Musical. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding musical talent" and "who sing, play an instrument, or dance very well," by age-mates in the school location.

035 Peer Nomination: Verbal. Transformed distribution of values based upon frequency of nominations of persons "who have a lot of ability in dealing with words" and "who are outstanding speakers or writers" by age-mates in the school location.

036 Peer Nomination: Hidden Talent. Transformed distribution of values based upon frequency of nominations of persons "who have some hidden ability" or "who have shown a great deal of talent" by age-mates in the school location.

041 Peer-Nomination: Negative Academic Model. Number of times named by age-mates in response to "Name three persons you would not ask for help if you had to work on a problem."

043 Peer-Nomination: Negative Behavior Model. Number of times named by age-mates in response to "Name three persons you would not like to be like."

044 Peer-Nomination: Amoral. Number of times named by age-mates in response to "Name three persons who do whatever they feel like doing a lot of the time. They don't seem to care what they do to other people, or what other people think."

045 Peer-Nomination: Expedient. Number of times named by age-mates in response to "Name three persons who are strictly out for themselves, but they keep an eye on what others think of them. They stick to the rules as long as it gets what they want.

046 Peer-Nomination: Conforming. Number of times named by age-mates in response to "Name three persons who get along with whatever crowd they are in. They don't do much independent thinking but they can be counted on to do what is expected."

047 Peer-Nomination: Irrational Conscientious. Number of times named by age-mates in response to "Name three persons who have their own set of moral principles and conform to them rigidly--everything is either 'right' or 'wrong.' For example, they may always be 'honest' no matter what effect it may have on others."

048 Peer-Nomination: Rational Altruistic. Number of times named by age-mates in response to "Name three persons who genuinely care about the way their behavior affects other people and they try to think ahead of time so that they will treat others fairly. They have solid moral principles of their own and they try to live up to them."

Cognitive Attributes

074a CTMM Mental Function. Intelligence (IQ) measured by the California Test Mental Maturity; short forms (SF) for junior (JH) and senior (SH) high schools;

ability to respond appropriately to language and nonlanguage stimuli having to do with spatial relationships, logical reasoning, numerical reasoning, and verbal concepts. (California Test Bureau, 1957).

075 STEP Listening. Scores based upon responses to Sequential Tests of Educational Progress; different forms in grade VII, 3A, grade VIII, 3B, and grade IX, 2A; comprehension of passages and questions read aloud; postulated to be a measure of cognitive apprehension, efficiency in attending to and concentrating upon verbal stimuli during the learning process. (Cooperative Test Division, 1958; Adelson and Redman, 1958.) Whiteside (1964) employs values for STEP Listening as an index of impulse control--attending to verbal stimuli while maintaining affective neutrality.

078 DAT Abstract Reasoning. Scores based upon responses to Differential Aptitude Test, Form A; administered to total population in grade VIII; ability to infer and demonstrate deductions from a series of problem figures. (The Psychological Corporation, 1947.)

079 DAT Space Relations. Scores based upon responses to Differential Aptitude Test, Form A; administered to total population in grade VIII; ability to deal with concrete materials through visualization, to manipulate things mentally, or create a structure in one's own mind from a plan by linking graphic patterns and figures.

080 DAT Mechanical Reasoning. Scores derived from responses to Differential Aptitude Test, Form A, in grade VII; pictorially presented mechanical situations with zoning, ability to formulate complex conceptions of many kinds from figural materials, as well as visualization and mechanical experience. (Guilford, Kettner, and Christensen, 1956.)

081 DAT Clerical Accuracy. Scores derived from responses to Differential Aptitude Test, Form A, in grade VII; quickness and accuracy of making comparisons between two lists of letter and number combinations.

082 Gestalt Transformation. Scores derived from Guilford Factor Tests (GFT) responses in grades VII and IX; indicate which of five objects has a part which could be used in carrying out a stated operation; postulated to be a measure of an aspect of conceptual redefinition, ability to shift the function of a part of an object and use it in a new way. (Guilford, 1959; Guilford and others, 1951; Hertzka and others, 1954; Wilson, 1958.)

083 Consequences. Scores derived from GFT responses in grades VII and IX; list different consequences or possible results of changes in human or natural situations; postulated to be a measure of an aspect of conceptual foresight, ability to go beyond what is given and extrapolate outcomes, and to be an element of originality. (Barron, 1955; Frick and others, 1959; Guilford, 1959; Wilson, Guilford, and Christensen, 1953.)

084 Unusual Uses. Scores derived from GFT responses in grades VII and IX; list different uses for common objects; postulated to be a measure of an aspect of spontaneous flexibility, ability to shift from one class of ideas to another, and an element of originality. (Barron, 1955; Frick and others, 1959; Guilford, 1959; Wilson, 1958; Wilson, Guilford, and Christensen, 1953.)

085 Common Situations. Scores derived from GFT responses in grades VII and IX; list problems suggested by everyday situations; postulated to be a measure of an aspect of ideational fluency, ability to call up as many ideas or responses as possible in a given time. (Frick and others, 1959; Guilford, 1959; Wilson, 1958; Wilson and others, 1954.)

086 Rhymes. Scores derived from GFT responses in grade VII; write words that rhyme with given words; presumed to be a measure of an aspect of word fluency or verbal facility; listing words satisfying a specified requirement. (Guilford and others, 1951; Guilford, 1959.)

087 Seeing Problems. Scores derived from GFT responses in grades VII and IX; list problems that might arise in connection with the structure, use, or operation of common objects; postulated to be a measure of an aspect of sensitivity to problems, awareness that problems exist. (Guilford, 1957; Wilson, 1958; Wilson and others, 1954.)

088 Gestalt Completion. Scores derived from Kit of Reference Tests (KRT) responses in grade VII; identify objects with parts missing; postulated to be a measure of an aspect of symbolic closure, or recognition of symbols. (Guilford, 1957; Wilson and others, 1954.)

089 Mutilated Words. Scores derived from KRT responses in grades VII and IX; identify words composed of partial letters; postulated to be a measure of an aspect of symbolic closure, or recognition of symbols. (Guilford, 1957; Wilson and others, 1954.)

090 Short Words. Scores derived from KRT responses in grades VII and IX; encircle groups of four consecutive letters, embedded in rows of letters, that spell out a common English word; postulated to measure speed of perceptual closure, or ability to cognize symbolic units. (Guilford, 1959.)

091 Dotting. Scores derived from Psychomotor Test II (PMT) responses in grade VII; place three pencil dots in each of a series of small circles, timed; postulated to measure psychomotor speed. (Fleishman, 1954.)

092 Discrimination Reaction Time. Scores derived from PMT responses in grade VII; place a check mark in an appropriate space according to the position of a white circle in relation to a black circle in a preceding square, timed; postulated to measure discrimination reaction time. (Fleishman, 1954.)

Personality Attributes

094 JPQ 1: Emotional Sensitivity vs. Toughness. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "If you read something sad in a story, do you (a) find it hard to keep the tears away, or (b) say, 'Oh! It's only a silly story'?"; similar to tender vs. toughminded factor among adults (Factor I of 16 PF). (Cattell and Associates, 1952; Cattell and Beloff, 1953; Cattell and Gruen, 1954.)

096 JPQ 3: Neurotic, Fearful Emotionality vs. Stability or Ego Strength. Scale values derived from JPQ responses in grade VII; twelve items such as "When people play a joke on you, do you usually enjoy it too, without feeling at all upset?"; combines two factors recognized among adults as main elements in neuroticism compared with self confidence and ego strength. (Cattell and Associates, 1953.)

097 JPQ 4: Will Control vs. Relaxed Casualness. Scale values derived from JPQ responses administered in grade VII; twelve items such as, "Do you spend most of your pocket money each week (instead of saving most of it)?" Those who score high tend to be self-controlled, orderly, persistent, punctual, but somewhat inhibited; postulated to be a measure of the degree to which parents have influenced behavior standards and the character of the respondent. (Cattell and Associates, 1953.)

099 JPQ 6: Cyclothymia vs. Schizothymia. Scale values derived from JPQ responses in grade VII; twelve items such as "Do you think that people understand and like you?"; sociable, easy-going, and warmhearted contrasted with dislike of groups, some rigidity, and seriousness. (Cattell and Associates, 1953.)

101 JPQ 8: Socialized Morale vs. Dislike of Education. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "When you have to write an essay about your thoughts on some subject do you (a) sometimes enjoy it, or (b) generally dislike having to do it?"; acceptance of school and cultural standards contrasted with dislike of learning and negative reaction to authority.

102 JPQ 9: Independent Dominance. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "Do you sometimes think there are too many rules and regulations, and that you should be more free to say what you want to do?"; subjects with high scores represent themselves as being dominant, competitive, unrestrained, with some difficulty in communication.

103 JPQ 10: Energetic Conformity vs. Quiet Eccentricity. Scale values derived from JPQ responses in grade VII; twelve items such as "Do you find it hard to talk to the captain of a team or some important boy or girl in school?"; the lively, conforming mixer and the retiring, thoughtful person.

104 JPQ 11: Surgency vs. Desurgency. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "Would you rather spend an evening (a) with the hobby you like most, or (b) at a gay party?"; talkative, excitable, gay, and likes variety, in contrast to being serious, quiet, and interested in detailed, exact undertakings.

Motives and Attitudes

106 SSHA Scholastic Motivation. Scale values derived from SSHA responses in grades VII and IX; fifty-five items such as "Whether I like a subject or not, I still work hard to make a good grade" and "Unless I really like a subject, I believe in only doing enough to get a passing grade"; odd-even reliability .95, with Spearman-Brown correction, in grade VII; postulated to be a measure of academic attitude or motivational orientation towards scholastic achievement. (The SSHA instrument yielded a number of subscales which were employed only in the seventh grade: 106a, 106b, 106c, 106d, 106e, 106f.) (Brown, 1956; Brown, McGuire, & Holtzman, 1955; Holtzman, Brown, & Farquhar, 1954; McBee & Duke, 1960.)

107 CMAS Anxiety. Scale values derived from Children's Manifest Anxiety Scale responses in grades VII and IX; forty-one items such as "I have trouble making up my mind," "I worry about what my parents will say to me," "My hands feel sweaty," "I worry about what other people think of me," and "It is hard for me to keep my mind on school work"; odd-even reliability .90 with Spearman-Brown correction, in grade VII; postulated to be a measure of underlying anxiety, or the motive to avoid failure, especially in ego-involving, threatening, or stressful situations. (Atkinson, 1957; Castenada, McCandless, and Palmero, 1956; Phillips, King, and McGuire, 1959; Phillips, Hindsman, and Jennings, 1960.)

108 CYS Criticism of Education. Scale values derived from CYS responses in grade VII; ten items such as "Most teachers are too rigid and narrow-minded" and "It is almost impossible for the average student to do all of his assigned homework"; average items-test reliability .86 in grade VII; postulated to be a measure of a set to be negative toward teachers and critical of what is expected in the school. (Moore and Holtzman, 1965, pp. 29).

109 CYS Criticism of Youth. Scale values derived from CYS responses in grades VII and IX; six items such as "Silliness is one of the worst faults of most teen-agers" and "Teen-agers gossip too much about each other"; average item-test reliability .67 in grade VII; postulated to be a measure of a set to find fault with one's age-mates and criticize their behavior, reflecting pressures toward social conformity manifested by a concern for good appearances. (Moore and Holtzman, 1965, pp. 30; Phelps and Horrocks, 1958.)

111 CYS Authoritarian Discipline. Scale values derived from Texas Cooperative Youth Studies (CYS) responses in grades VII and IX; nine items such as "Strict discipline develops a fine strong character" and "A person my age should take the school subjects which his parents decide would be best for him"; average item-test reliability .77 in grade VII; postulated to be a measure of a set to accept authoritarian beliefs and the control of authority figures. (Frenkel-Brunswik, 1951; Moore and Holtzman, 1965, pp. 28.)

112 CYS Negative Orientation to Society. Scale values derived from CYS responses in grades VII and IX; eight items such as "When you get right down to it no one is going to care much what is going to happen to you," "A person should insist on his own rights no matter what the cost," and "If you don't watch yourself, people will take advantage of you"; average item-test reliability .78 in grade VII; postulated to be a measure of an aspect of the alienation syndrome which is marked by distrust, egocentrism, pessimism, resentment, and anxiety. (Davids, 1955, 1956; Moore and Holtzman, 1965, pp. 27.)

113 CYS Self Inventory. Scale values derived from CYS responses in grade VII; eight items such as "I often have the feeling I will say something wrong"; postulated to be a measure of attitude towards one's own competencies. (Moore and Holtzman, 1965, pp. 32.)

114 CYS Personal Maladjustment. Scale values derived from CYS responses in grades VII and IX; 21 items such as "Sometimes I feel things are not real," "I get mad and do things I shouldn't do when I can't have my way," "I feel tired all the time," and "Sometimes criticism gets me down"; average item-test reliability .90 in grade VII; postulated to be a measure of ineffective or borderline in contrast to the effective behavior of a mentally healthy individual--misperception of the self and the object world, inability to cope with pressures imposed by others, lack of a sense of identity. (This test was later renamed Personal Adjustment.) (McGuire, 1956; Moore and Holtzman, 1965, pp. 36-37.)

116 CYS Social Inadequacy. Scale values derived from CYS responses in grades VII and IX; twelve items such as "I have trouble making friends easily," "I'm afraid people will laugh at me because I'm not sure how to act," and "I don't feel sure how to act on dates"; average item-test reliability .93 in grade VII; postulated to measure an aspect of interpersonal competence in terms of a lack of ability to interpret the intentions of others and an inability to form person-to-person relationships. (Foote and Cottrell, 1955; Moore and Holtzman, 1965, pp. 37-38.)

122 NNAS Aggression Anxiety. Self report variable based upon responses to Need-Need Anxiety Scales in grades VIII and IX; ten items such as "I hate any form of argument and will go out of my way to avoid it"; anxiety about one's own aggressive behavior or tendencies and about the discomfort which may result in other people. (Cattell and Scheier, 1958; Galliani, 1960.)

124 NNAS Achievement. Self report variable based upon responses in grades VIII and IX to the Need-Need Anxiety Scales; ten items such as "I set very high goals for myself which I try to reach"; seeking out situations in which evaluations of standards of excellence are easily made and in which one has good chances

of rating high. (Child, Frank, and Storm, 1956; Galliani, 1960; Storm, Rosenwald, and Child, 1958.)

125 NNAS Aggression. Self report variable based upon responses in grades VIII and IX to Need-Need Anxiety scales; ten items such as "I like lively discussions with people whose opinions differ from mine, because it gives me a chance to tell them just what I think of their ideas"; willingness to coerce or injure another person when threatened or frustrated. (Child, Frank, and Storm, 1956; Galliani, 1960; Veroff, 1957.)

Cultural Pressures

130a ISS Family Status. Index of social status derived from weighted values (McGuire and White, 1955) for occupation, source of income, and education of the status parent as reported on an identification blank and checked with informants in grades VII, VIII, and IX; index values may be converted to estimates of social class of the family in the community; namely, upper class (UC), 12 to 21; upper middle (UM), 22 to 36; lower middle (LM), 37 to 51; upper lower (UL), 52 to 66; lower lower (LL), 67 to 84; postulated to be an indicator of variations in learning experiences in pressures and reinforcements from members of the family, and in expectations held for the boy or girl by school people. (The "Index of Value Orientations," 130b, was employed only in the seventh grade.) (McGuire, 1953, 1954; McGuire and White, 1957; Warner, Meeker, and Eels, 1949.)

131 CYS II Family Tension. Postulated to be a measure of responses to parental restrictions and/or manipulative controls, culmination in resentment and hostility (e.g., "Everyone in my family seems to be against me" and "My parents often object to the kind of boys and girls I go around with"). (Moore and Holtzman, 1965.)

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